Mitsubishi Electric Europe, B.V.

Instruction manual

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MITSUBISHI ELECTRIC
Changes for the Better

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Table of contents

1 Introduction 5
2 Nethunter basics 6
2.1 Definitions 6
2.2 Main Nethunter modules logo & icons 7
2.3 Supported devices 7
System architecture overview 10
2.4 First steps 13
2.4.1 Nethunter installation 13
2.4.2 Uninstalling Nethunter components 15
2.4.3 Licensing options & registration 16
2.4.4 Devices configuration 17
3 Nethunter client functionalities 19
3.1 Login to Nethunter 19
3.2 Main screen 19
3.3 Navigation components & toolbars 22
3.3.1 Explorer 22
3.3.2 PTZ (Pan, Tilt, Zoom control) 22
3.3.3 Splits 23
3.3.4 Views 23
3.4 System monitor 24
3.4.1 Context menu (right mouse button) 26
3.4.2 Groups / Folders information 26
3.5 Live 27
3.5.1 Context menu (right mouse button) 27
3.5.2 Split text information and indicators 28
3.5.3 Maps 28
3.5.4 Sequences 29
3.5.5 Digital zoom 29
3.5.6 Live audio streaming 29
3.5.6.1 Icons when broadcasting audio 31
3.6 Playback 32
3.6.1 Context menu (right mouse button) 32
3.6.2 Search & play controls 34
3.6.3 DVR Speed adjustment 35
3.6.4 Digital zoom 35
3.7 Scheduling 36
3.7.1 Downloads (New download) 36
3.7.2 Time Synchronization (New time synchronization) 37
3.7.3 Scheduled tasks list content 38
3.7.4 The time scheduling component 38
3.7.5 The download scheduling component 39
3.7.6 Scheduling examples 40
3.8 Downloads 42
3.8.1 Digital Signature 42
3.8.2 Nethunter exports viewer 43
3.8.3 Native format downloads 43
3.8.4 Quick downloads 44
3.9 Events 44
3.9.1 Context menu (right mouse button) 47
3.9.2 Real-time events (RT events) 47
3.10 Settings 48
3.10.1 General 49
3.10.2 Users 50
3.10.2.1 Real-time events disabled periods 51
3.10.3 Splits 54
3.10.4 Explorer tree (groups/folders) 55
3.10.5 Maps 56
3.10.6 Devices 57

3.10.6.1 Getting and releasing control *57*
3.10.6.2 Adding new devices *57*
3.10.6.2.1 DVR *58*
3.10.6.2.2 Nethunter Recorder (NVVR) + IP Cameras *59*
3.10.6.2.3 NV100E *63*
3.10.7 Remote configuration *66*
3.10.8 Real-time events classification *66*
3.10.8.1 Category actions *66*
3.10.8.2 Events and categories *67*
3.10.9 Users' permissions for devices *68*
4 Nethunter server functionalities 70
5 Nethunter recorder setup (NVVR) 71
5.1 Nethunter recorder (NVVR) start-up 71
5.2 Recorder Remote configuration 71
5.3 General NVVR configuration 72
5.4 NVVR alarms configuration 73
5.5 NVVR scheduling configuration 75
5.6 IP recording disk space calculation 76
5.7 NVVR Events and errors 76
5.8 NVVR additional modules 80
6 Nethunter Multiserver Monitor 81
6.1 Servers and devices tree 81
6.2 Devices information list 83
6.3 Real-time events 83
6.4 Settings 83
6.4.1 General *83*
6.4.2 Servers *84*
6.4.3 Real-time events *85*
6.5 Groups / Folders information 85
7 Appendixes 86
7.1 DVR resolutions according to the "DVR Decompression Size" parameter 86
7.2 Hardware requirements (IP Cameras system) 87
7.3 Installation use cases & recommendations 89
7.4 Network requirements. Bandwidth calculation 90
8 Notes 92
8.1 DVR management 92
8.1.1 DVR connection & Nethunter ports limitation *92*
8.1.2 On-Demand connection & disconnection *92*
8.1.3 Get Events not available for old DVR models *92*
8.1.4 Disconnection effect: frozen images *92*
8.1.5 Decompression CPU: discarding images *92*
8.1.6 Visual defects in TL304/304EX/308/5716 ..... *92*
8.2 Client-Server 92
8.2.1 Server disconnection *92*
8.2.2 Settings administration *92*
8.3 Devices 93
8.3.1 IP Camera settings *93*
8.3.2 IP camera network configuration *93*
8.4 Backups 93
8.4.1 Database backups between different NH versions *93*
8.5 Performance under high CPU consumption conditions 93
8.6 NVVR maintenance advices 94
8.7 Special scenario : two NHServers connected to the same NVVR 94
8.8 Automatic dvr reconnection 94
8.9 Auto log-off after an inactivity period 95
8.10 Two NVVRs in the same remote site 97

1 Introduction

Since some time ago the CCTV market is in a technological changing process. CCTV systems have been based and nowadays are based on Digital Video Recorders, DVRs, with analogue cameras. Although the analogue cameras and DVRs are covering most of the market, there is a migration process to IP CCTV systems.

One of the main reasons for this evolution is the introduction level and development of data communications through high speed connections has reached very high penetration levels. These kinds of networks, based in IP technology, are allowing the convergence of all kinds of communications in a single network with a single protocol.

Taking advantage of the existing network infrastructure, the IP CCTV Systems are able to generate some savings like the reuse of existing data network and for the lower costs of the wiring installation. The network cable is cheaper than the coaxial cable and it is able to cover longer distances without suffering quality signal reduction.

Taking into account this scenario, Mitsubishi Electric has developed Nethunter, one software platform which allows the coexistence of systems, DVR support and IP systems. Nethunter manages the Mitsubishi DVRs and the Mitsubishi IP systems giving the opportunity to migrate step by step to a complete IP system.

Mitsubishi Electric has developed Nethunter after analyzing the market and reaching the conclusion that IP systems are now ready in the market but the main CCTV market is still using DVRs with analogue cameras. Under this premise Mitsubishi Electric has developed a software platform which gives you the opportunity to migrate to IP systems step by step.

In the following pages you will find all the information needed to install and work with Nethunter.

2 Nethunter basics

Nethunter is an essential single-server video system managing IP cameras, NVR and Mitsubishi DVR, including full-featured remote access. Nethunter combines the CCTV knowledge of Mitsubishi with a new design focused on usability, making it an easy tool that mixes installation of IP and analogue Mitsubishi systems.

Nethunter contains for the Mitsubishi IP cameras; such as camera control, motion detection (HW), intelligent PTZ and archiving to local drive. Also it is compatible with all the Mitsubishi DVR giving the opportunity to migrate to an IP solution step by step from the actual CCTV solution based on Mitsubishi DVR.

Nethunter is compatible with:

- Mitsubishi hardware and any other IP devices: IP Box camera, Dome camera, PTZ camera, IP video server and NVR, third-party cameras …
- Mitsubishi DVR, all the different models Mitsubishi have developed or will develop.

Nethunter main functionalities:

- Single server video surveillance for managing Mitsubishi IP cameras, Mitsubishi NVR and Mitsubishi DVR.
- Multiple clients supported.
- Live and playback view.
- PTZ, Patterns, Tours, Presets, Auto scans management.
- Multiple views layout. Fully configurable views.
- Multiple screen support and Mitsubishi Data Display Walls.
- Remote configuration of IP systems and DVR.
- Hierarchic groups' creation & maintenance through an explorer view.
- Maps management.
- Actions triggered by hardware alarms.
- User creation and maintenance with permissions.
- Automated and manual downloads of the recorded video.
- Different scenarios supported:
  - Scalable system through NVRs and/or DVRs.
  - Multiple IP cameras supported both for live or recording operations.
  - Network storage options: NAS, SAN …

2.1 Definitions

DVR / NVR

Hardware recording devices (see supported devices list for more information).
DVR works for analog cameras, and NVR is intended for recording IP cameras.

ENCODER

Hardware device that converts analogical cameras signal into IP MPEG-4/H.264 video streaming transferred to Nethunter or to an NVR through TCP/IP.

IP camera

Digital video camera that captures MPEG-4/H.264 video and streams it through a TCP/IP network, being accessible by Nethunter and NVR devices.

NVVR: Nethunter IP recorder

Nethunter module that records IP cameras video streams into server mapped disk devices (SAN, local HDD, etc…). Also it is able to schedule, manage alarms, playback, create rules, etc…
The NVVR (Network Virtual Video Recorder) concept is similar to NVR or DVR in terms of isolation and main functionalities, being software based on the hardware that better fits your needs (Failover & redundant Server, standard PC or Workstation …)

Nethunter Server

Software piece that connects to the DVR, NVR and NVVR devices and maintains the configuration database. This module is the Nethunter core application that is able to manage all the different devices in terms of connectivity, settings management and Nethunter clients connection pooling and control messaging.

Nethunter Client

This is the main application that allows any operator to connect to the server and start administrating all the server content. The system can have multiple clients connected to the same server and performing different actions with the connected devices.

Nethunter Multiserver Monitor
This component is intended to monitor scenarios with more than one NHServer. Apart from device status, users can set event classification in order to be notified when specific events are received.

Netunter control panel
Startup application that helps managing Nethunter applications and services in terms of startup and shutdown.

2.2 Main Nethunter modules logo & icons

Control panel:

Server:

Client:

NVVR:

Multiserver Monitor:

2.3 Supported devices

The following IP and recorder devices are supported by Nethunter software for a centralized administration or monitoring and surveillance. The recording and alarms capabilities rely on the DVR and the IP recorder (NVVR).
The IP cameras are connected to the network for live or recording purposes and the recorder virtual device NVVR runs on the server PC.

DVR recorders

DVR recorder device	*Description*
DX-TL950E	*9 channel digital time lapse recorder with M-JPEG compression and 10GB of HDD.*
DX-NT400E	*4 channel digital recorder with networking capability and unique removable HDD tray.*
DX-NT430E	*4 channel digital recorder with networking capability and unique removable HDD tray. ATM connection available.*
DX-TL2500E	*16 channel digital recorder with networking capability and web browser built in. Wavelet compression standard.*
DX-TL2530E	*16 channel digital recorder with networking capability and web browser built in. Wavelet compression standard. ATM connection available.*
DX-TL4509E	*Digital recorder that records up to 9 channels with JPEG2000 format*
DX-TL4516E	*Digital recorder that records up to 16 channel with JPEG2000 format*
DX-TL4716E	*Digital recorder that records up to 16 channel with JPEG2000 format.* *It supports up to 200 fps instead of 100 fps supported by the DX-TL4516 dvr.*
DX-TL5000E	*Digital recorder that supports up to 16 channels with advanced functionalities.*
DX-TL304E	*Digital recorder that records up to 4 channels with MPEG-4 format*
DX-TL304EX	*Digital recorder that records up to 4 channels with MPEG-4 format and XGA video output*
DX-TL308E	*Digital recorder that records up to 8 channels with MPEG-4 format and XGA video output*
DX-TL5716E	*Digital recorder that records up to 16 channels with MPEG-4 format*
DX-NV100	*Digital recorder that records up to 16 IP cameras with MPEG-4 format*
DX-TL-4	*Digital recorder that records up to 4 channels with MPEG-4 format*

IP Cameras and IP Encoders

IP camera/device	*Description*
NM-C110	*Progressive Scan with Full-Duplex Audio*
NM-C130FD	*540TV Lines and IP66 Vandal-Proof*
NM-C150SD	*PTZ Dome with 18x Optical Zoom*
NM-VS100	*4CH Video Server with High Resolution and Bi-Directional Audio*
IPE100	*Mini domo IP camera with optional VA software module*
IPE1100/IPE1100M	*IP Box camera with optional VA software module and Megapixel camera*
IPE4100	*PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output Outdoor with outdoor housing & fan/heater*
IPE4500	*PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output*
IPE5500	*PTZ x10 zoom level IP camera with optional VA software module*
NVC1000	*1CH Video Server with High Resolution, MPEG-4 and H.264. Optional VA software module.*
NVC-4000L	*4CH Video Server with High Resolution, H.264. Optional VA software module.* *Note: Only one video channel is supported by NH. Moreover, the DX-NV100 recorder doesn't support it.*
NVC-4000	*4CH Video Server with High Resolution, H.264. Optional VA software module.*
NVC-4000-R12	*4CH Video Server blade card with High Resolution, MPEG-4 and H.264. Optional VA software module.*
NVC-4000-R40	*4CH Video Server blade card with High Resolution, MPEG-4 and H.264. Optional VA software module.*
IPE3500	*Domo IP camera with optional VA software module*
IPE3500M	*Domo megapixel IP camera with optional VA software module*
IPE6500	*Infrared leds camera with optional VA software module*
IPE1202HD	*Full HD 2 megapixels box camera with optional VA software module*
IPN1202HD-5241	*Full HD 2 megapixels box camera with optional VA software module*
Smartec STC-IPX3060A series	*IP Box camera with optional VA software module*
Smartec STC-IPX2050A	*Mini domo IP camera with optional VA software module*
Smartec STC-IPX3560A series	*PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output*
Smartec STC-IPX3980A	*PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output*
Smartec STC-IPX3905A Series	*PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output Outdoor with outdoor housing & fan/heater.*
Smartec STS-IPTX161	*1CH Video Server with High Resolution, MPEG-4 and H.264. Optional VA software module.*
Smartec STS-IPTX181	*4CH Video Server with High Resolution, MPEG-4 and H.264. Optional VA software module.*
Smartec STC-IPMX3092A Series	*Megapixel IP Box camera with optional VA software module*
Smartec STC-IPX3905A	*Domo , PTZ x36 zoom level IP camera with optional VA software module & 4/2 Input/Output*
Axis 209MFD	*Megapixel resolution with PoE (Power over Ethernet) and easy installation*
Axis 210A	*Progressive Scan with PoE*
Axis 211M	*Megapixel resolution with PoE*
Axis 215 PTZ	*PTZ Dome with 48x total Zoom (12x optical and 4x digital). Day/Night function with removable IR filter.*
Axis P1343	*Day and night camera with POE*
Axis P1344	*1 megapixel resolution, day and night camera with POE*
Axis P1346	*3 megapixel resolution, day and night camera with POE*
Axis P1347	*5 megapixel resolution, day and night camera with POE*

Axis Q1755	*2 megapixel resolution, day and night camera with POE*
Axis P3301	*H264, domo and POE*
Axis P3304	*One megapixel ,H264 and domo*
Axis P3343	*Day and night camera with POE*
Axis P3344	*One megapixel resolution, day and night camera with POE*
Axis M3203	*H264, domo and POE*
Axis M3204	*One megapixel, H264, domo and POE*
Axis Q6032-E	*Dome and POE*
CBC GANZ ZN-NH11VPE	*IP Box camera with optional VA software module*
CBC GANZ ZN-NHW11VPE	*IP Box camera with optional VA software module*
CBC GANZ ZN-NH21VE	*Megapixel camera*
CBC GANZ ZN-D100VE	*Mini domo IP camera with optional VA software module*
CBC GANZ ZN-DNT350VPE	*Domo IP camera with optional VA software module*
CBC GANZ ZN-DWNT350VPE	*Domo IP camera with optional VA software module*
CBC GANZ ZN-S100V	*1CH Video Server with High Resolution, MPEG-4 and H.264. Optional VA software module.*
CBC GANZ ZN-S1000VE	*1CH Video Server with High Resolution, MPEG-4 and H.264. Optional VA software module.*
Sanyo VCC-HD5400P	*Full HD 4 megapixel compact indoor PTZ dome, day/night, POE*

NOTE

- Nethunter is continuously increasing the amount of available hardware and integrated devices.
Please, check with your Mitsubishi office or distributor for the latest updated hardware list support.

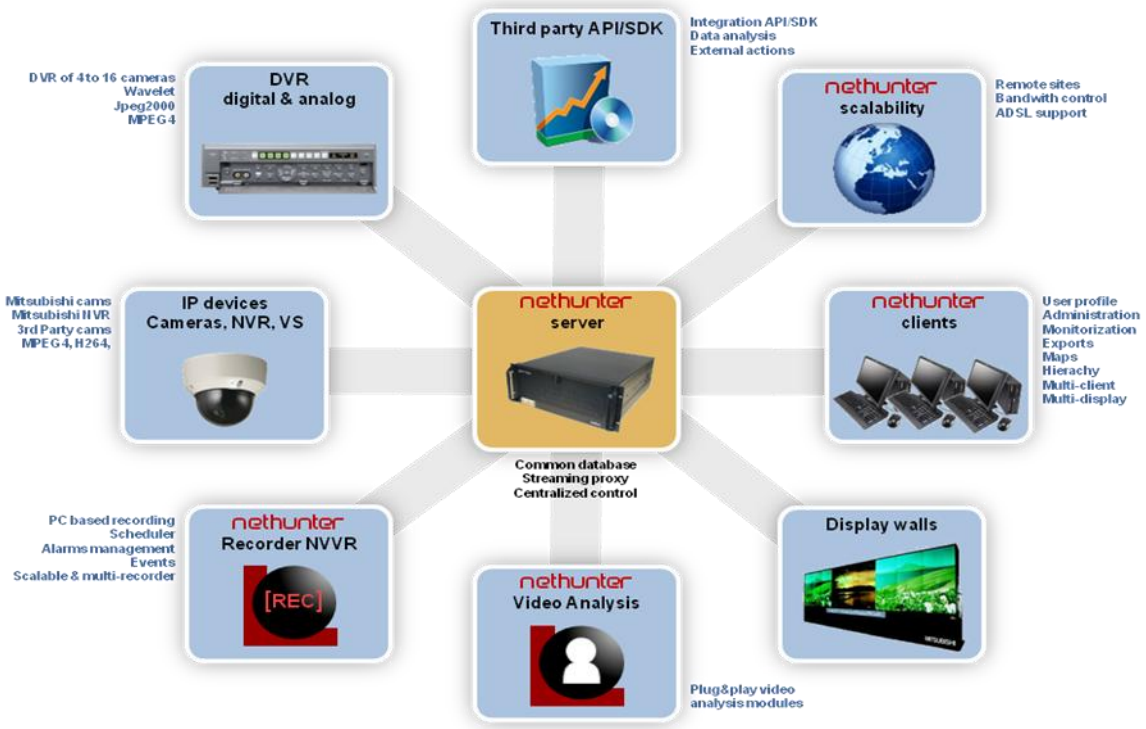
- In Axis series 2XX models it's possible to change its IP address only if the camera is in the same subnet as the Nethunter NVVR..To change the IP address of the camera, please access to its web server and change it to an IP in the same subnet as the Nethunter NVVR.

- In Axis PTZ model (all supported models) the actions treatment is different from the other models (Mitsubishi, UDPTech or Smartec).With this model, custom information for action (Preset, etc) can be displayed.

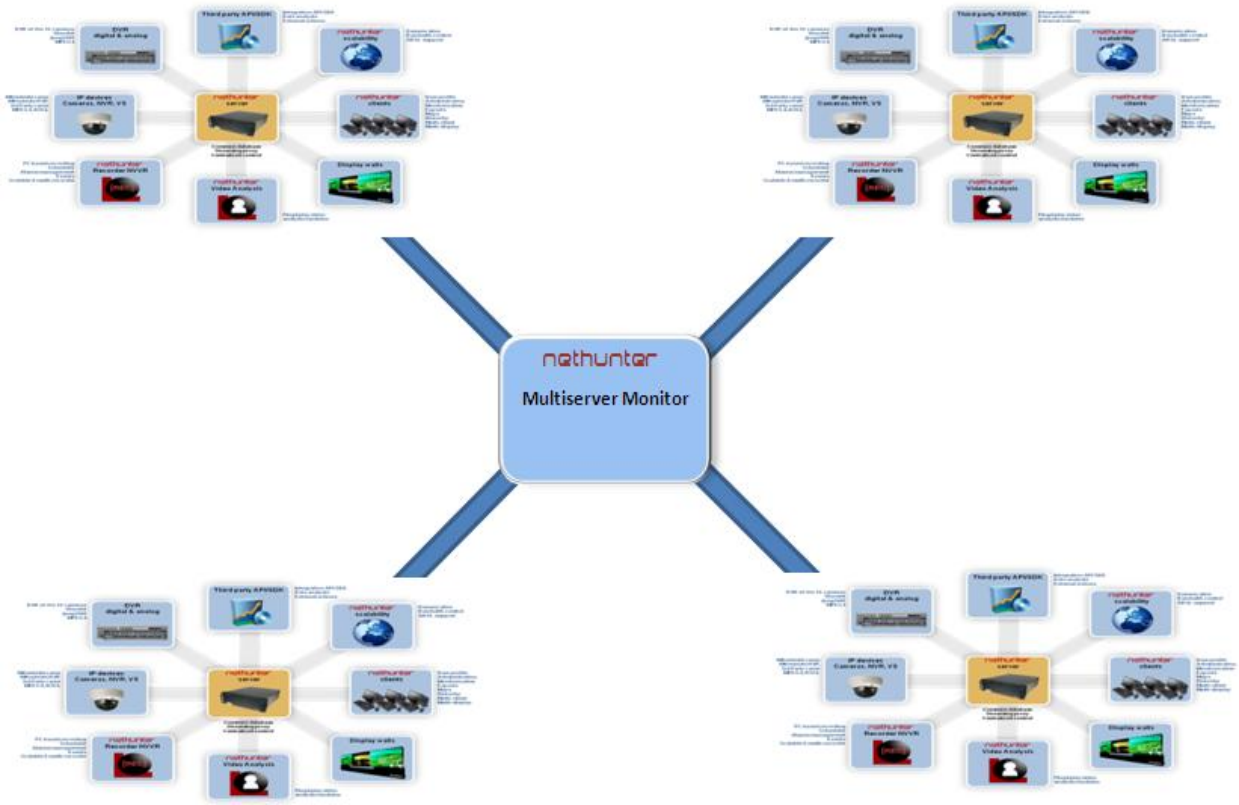
System architecture overview

Nethunter architecture is scalable and fully flexible, adjusted to any surveillance and video analysis business needs.

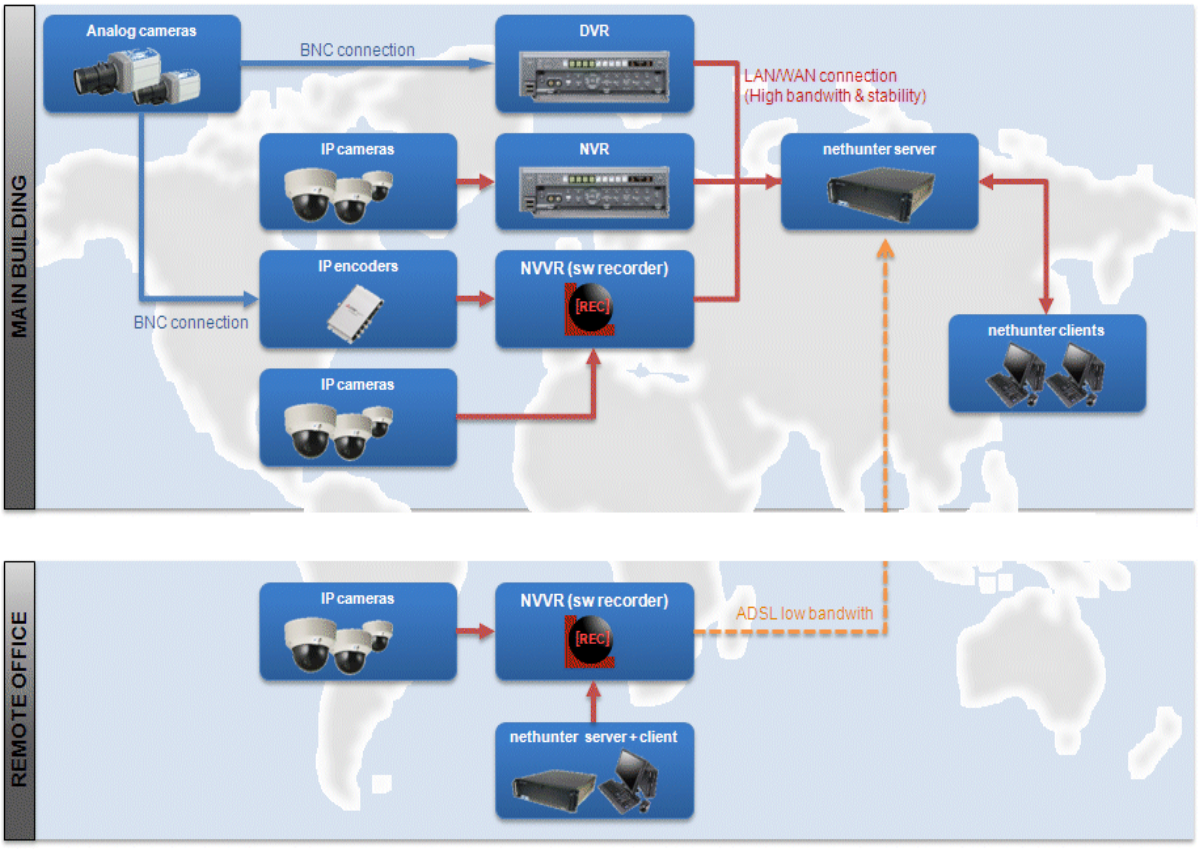
Nethunter supports multiple clients, multiple DVR, NVR, NVVR and IP camera devices, plus other connected modules including display wall and multiple monitor capabilities.



The module Multiserver Monitor allows an upper administration layer. Its purpose is to monitor several NHServers on the network. See below how the architecture looks like for that case :



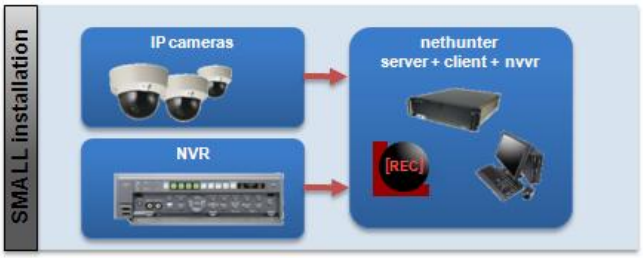
On the following diagram, Nethunter is configured on a typical distributed installation with different network configuration options.



Through the blue analog BNC connections analog cameras & devices are connected to a DVR or to a IP encoder device.
The red ones are the IP network (LAN & good bandwidth networks)
Finally the orange dotted line stands for an interrupted line and low bandwidth connection.

Single client-server PC
The minimum scenario is one PC with a server-client-NVVR (the last one optional for IP) all together. It is an adequate configuration for small installations that do not require so much cameras nor devices and just one client for administration.
Also it is the typical configuration for DVR monitoring and management.

In the following example, there is an NVR (NV100) recording IP cameras video, and one PC with Nethunter server, client and NVVR (serving live video to server, controlling dual stream and connectivity bandwidth), all together.



2.4 First steps

2.4.1 Nethunter installation

First of all be sure that the Windows® user has all Administrator permissions. There are some components that require administrative permissions.
Run the Mitsubishi Nethunter installer. It is a self extraction file that includes all the required modules and applications.
This program can install the following software and all its dependencies:

- Nethunter Server (installed as a Windows® service)
- Nethunter NVVR (installed as a Windows® service)
- Nethunter Client
- Nethunter Multiserver Monitor
- Nethunter control panel

It is acceptable to install the five components together. Please, check this manual to see the hardware PC recommendations.

You will be asked to choose what components you want to install.
The main dependencies that will be installed are: Microsoft .NET framework 3.5, C++ runtime libraries support, Microsoft SQLServer client libraries or server application, ffmpeg, MEncoder and Haali media splitter (under user confirmation) for Matroska (.mkv) download format.

In the case that your PC fails during the installation of any extra components, please download them and install from the original vendor locations: Microsoft® .NET framework and Microsoft®SQLServer, in the downloads section at: http://www.microsoft.com

Windows® Vista and Windows®7 user accounts considerations
Before installing Nethunter on Windows® Vista or 7, please, ensure that User Account Control is disabled (UAC). In order to disable it, go to Control Panel >> User Accounts. There, turn user account off. If this setting is incorrect, Nethunter may not start-up (database related problems).

Nethunter Server and Nethunter NVVR are installed by default as Windows® Services.
You can access the Windows® services control through the Start >> Control Panel >> Administration tools >> Windows® Services.
The services are named as “NHserver” and “NHnvvr”. They can be stopped, started and manually controlled in the same way as any other Windows® service or through the Nethunter control panel application.

NOTE
Screensaver is forbidden: It is not allowed to have a screensaver in the Nethunter server nor in the client. The screensaver may cause the system to fail while processing images or client requests.
Ctrl-Alt-Supr.: It could also produce the client to fail while displaying images after pressing this keys combination. In this case, please restart the client.

NOTE
Both 32 bits and 64 bits Windows® versions are supported

NOTE
Due to internal reasons, NHClient will be automatically installed when Multiserver Monitor is installed.
Due to internal reasons, NVVR will be automatically installed when NHServer is installed.

System start-up
Nethunter environment start-up is built by different components. Some of them are started automatically as Windows® services.

An icon will appear for NVVR and another one for the Server. In case of using Windows® Vista™ or Windows® 7, the icons will only appear starting the software in “process mode” (through control panel).

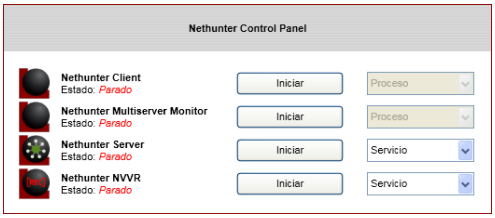
- **Nethunter Server**
  This is the Nethunter core application that grants the different Nethunter clients to connect to it by concentrating all the application settings, devices connectivity (IP, DVR …)
  This is the centralized management software that connects clients with devices. To start a client you must also start the Server.

- **Nethunter NVVR (IP recorder)**
  This component is the main IP recorder in Nethunter. Each NVVR device will be able to stream and record IP cameras or other IP devices (video servers …). You can have multiple NVVR machines on your system, each one running in a separate PC. Recorder devices like NVVR are standalone services or machines that continue working despite Nethunter server or clients are disconnected.
  It’s also necessary for watching live streams from IP Cameras and receiving alarms from them.

- **Nethunter Client**
  This component is the main application interface to manage Nethunter Server and all of its connected devices.
  When Starting the Nethunter client you can fill in the server IP address. By default the IP address is initiated to “127.0.0.1” which is equivalent to “localhost”.

- **Nethunter Multiserver Monitor**
  This component is intended to monitor scenarios with more than one NHServer. Apart from device status, users can set event classification in order to be notified when specific events are received.

- **Nethunter Control Panel**
  Smart application that helps to startup and shutdown any system component and also helps to have a fast overview of you main Nethunter services status.



Once started, the control panel icon will appear on the Windows® task bar. To show the control panel, just move the mouse over it. When leaving the mouse outside the window, the control panel will disappear.
You can stop any application and start it again manually as a normal process or as a Windows® service.
In order to close the control panel, right click with the mouse over the task bar icon.

NOTE

Some Windows® versions don’t show any icon in the taskbar for applications that are started as a Windows® service. Since Nethunter licenses registration requires to right click on that icon, you have to stop the service, and start the process manually in order to register the licenses.

Network considerations:
Nethunter is composed by different components that can run in different computers.
You can refer to the following table to see which connectivity options you have for your network configuration, and which ones will be the recommended scenarios on your network.

	LAN & good Network connections	ADSL & low bandwidth network connections	Unstable environment (Wireless broadband…)
Multiserver Monitor	**OK**	**OK**	**OK**
CLIENT	**OK**	NOT SUPPORTED	NOT SUPPORTED
SERVER	**OK**	**OK**	**OK**
NVVR Nethunter IP recorder	**OK**	**OK**	**OK**
DVR	**OK**	Not recommended on MPEG models	Not recommended on MPEG models
NVR	**OK**	**OK**	**OK**
IP CAMERAS	**OK**	**OK**	**OK**

2.4.2 Uninstalling Nethunter components

Open the Windows® Control Panel "Add or Remove programs" option. Look for the Nethunter application group and press the remove button.

This action will uninstall the Nethunter installed software and also will give you the choice to uninstall/remove the database settings, including the recorded video. If you remove the database settings, the entire configuration will be lost and after a new installation the system will need to be set up again from the beginning (devices IP addresses, maps, browser structure, etc.).

When migrating versions (2.0 or greater), the installer will guide you through the migration process. Please, read carefully the installation and migration steps for each version.

WARNING: MIGRATION FROM OLD VERSIONS

It is not possible to upgrade from previous Nethunter versions (1.x) to Nethunter 2.x, since the internal structures suffered from big changes, and cameras should be discovered and added again to the main database.

To install Nethunter 2.2 in a PC with an existing NetHunterIP version, you should remove the software first. Remove also the database content when you are asked (it is strongly recommended to take note of the old settings and devices, prior to removal)

All the components installed in the system must have the same version. Otherwise the system won't work.

2.4.3 Licensing options & registration

Nethunter is provided by default with a free basic license that allows connecting one IP camera for local recording, one DVR and unlimited NVRs. The software can be used with all its functionalities: devices management (DVR, NVR, and NVVR), multiple client pc, multiple displays, recording, downloading and exporting video, alarms management, etc…Not licensed devices will be shown as "Not licensed" in Monitor.

Cardcode activation

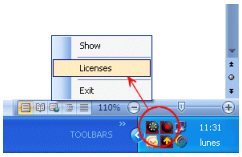
Once you purchase Nethunter licenses through your Mitsubishi distributor, you will receive a 6-char code named "CARDCODE". This code will generate and activation key for your PC.
Connecting to the ***http://www.mitsubishielectric.es/cardcode*** web page you will get your new license key. It's also possible to query your existing keys for other software options.
Detailed instructions will guide you through the activation process.

NOTE
Contact your Mitsubishi distributor to get the latest available software portfolio and also to purchase licenses that extend your current installation and increase your software functionalities.

Introducing license keys

The licensing of Nethunter products is implemented at ***server*** level or ***NVVR IP recorder*** level.
Each software license is valid for a unique PC. You have to decide which PC will have each component, prior to registering and activating the license keys.

If you received an USB security dongle with your license, please plug it in now in your PC. The licenses activation will be directly linked to the USB device.



Keep in mind that IP cameras licenses are introduced in the NVVR licenses option and DVR licenses are introduced in the NHServer licenses option. If any license was introduced in the wrong application and they are running in the same computer, restart the NVVR and the NHServer for them to take effect.

WARNING
Each PC provides a unique ID based on its internal parameters, including some hardware physical device identifiers, such as the MAC address of your network card. In the case that you use an USB dongle, the unique ID will be provided by this device.
On the first case, if you change some hardware of your PC, the system licenses may stop working.
Also if you change your PC with a new one, your licenses will not be valid anymore.
PCs with multiple network cards or network controllers (Wi-Fi, VPN …) may change the systemID unexpectedly. It is strongly recommended in these cases to request the use of a HASP dongle to Mitsubishi, or to disable the additional network controllers.

Please, contact Mitsubishi Support in the case that you have any licensing problem.

NOTE
*In Windows® Embedded systems, **the HASP dongle must be plugged in before the installation begins**.*

2.4.4 Devices configuration

Date and time

All the system information is normally based to the operating system date and time.
The DVR and NVR devices also include an internal clock and calendar that help the DVR scheduled tasks to run according the defined periods, and all the recorded video & events will be marked with this timestamp to let Nethunter viewers be able to manage/view/search it as appropriate.

During system setup and before start recording video, check and configure the correct date and time on all your devices.

Main configuration parameters

Static IP address for local devices: All the devices connected to Nethunter should be connected with a static IP address.
Dynamic IP address through DNS resolution: It is possible to configure the Nethunter IP recorder (NVVR) with a DNS name.
When connecting hardware devices to Nethunter, you have to be sure that each device is configured with a static IP address. Nethunter is not enabled nor recommended to work with dynamic IP address for local devices.
To configure each device IP address, please, refer to the device setup guide, due to each device might have different ways to configure.
It is really easy to setup devices into Nethunter, you only need to go to the settings section → devices option and add a new device, which is recognized by selecting the device model and its IP address.

Network

Nethunter components are connected using the TCP/IP protocol. The network configuration will be setup according to each business infrastructure and connectivity needs.
Due to security reasons, it is recommended to isolate clients and video capture devices, or recorder devices. Through Nethunter server working across firewalls, the Nethunter clients' security restriction will be ensured.

Bandwidth consumption

When building a network configuration for a Nethunter installation there are some things to be considered such as: Network bandwidth limits, switches, servers, connected clients, amount of cameras…

Any IP camera has some parameters that may affect the output video quality.
The main ones are the network/compression bandwidth, compression algorithm (MPEG-4, H.264...), resolution (D1, VGA …), frame rate and the GOP size.
The camera video flow is sent through a unique network connection. The camera bandwidth must be fixed in its webserver. With this premises, it is clear that the camera video quality or compression will be affected by the network bandwidth.
Each IP surveillance installer may consider the Business requirements to design correctly the network infrastructure.

The DVR devices specification details the maximum network bandwidth that the device will use on maximum operation parameters.

For a NVR device you should also check the network maximum parameters.

Finally the Nethunter components network consumption depends on:
NVVR: Depends on the amount of connected cameras (∑ bandwidth) and also depends on the amount of servers connected and the quantity of simultaneous live or playback video requests.
In the case of having 2 servers with 5 clients each one displaying a maximum of 9 cameras each one, the bandwidth will be:

NVVR output bandwidth = Camera bandwidth * 9 * 5 * 2
NVVR input bandwidth = Camera bandwidth * Amount of IP cameras
NVVR total bandwidth = NVVR output bandwidth + NVVR input bandwidth

It is possible to distribute some NVVR across you network, and also connecting multiple Nethunter servers to your NVVR.

On the other hand in the case of big installations it is recommended to use multiple network cards to diversify the traffic, isolate the recording flow from the display network consumption, or simply to increase the amount of supported cameras.

Nethunter server is just a video proxy and central settings database, which simplifies the connectivity of multiple clients to multiple devices.
The Nethunter server is forwarding video between the devices and the clients. This video has the native format and the decompression will take place on the client side. When calculating your network topology, consider the network consumption that the clients will produce.

DSL connectivity

It is possible to connect some Nethunter components/devices through a DSL connection in order that distributed offices/branches of a business may have different connectivity options.
When the network connection is not so good, you can choose to install a remote NVVR with bandwidth control limitation adjusted to the realistic network speed; the NVVR will adjust the video flow depending on this parameters and video demand.
Other devices like some DVR models also allow.

Router configuration:

When connecting an NVVR to an ADSL, you have to ensure that the NVVR ports are open on your router in both directions. The NVVR ports by default are 37000 and 38000, but you can change them to a more suitable one for you, or take advantage of NAT router options.

Dynamic IP:

Nethunter and NVVR support dynamic IP address management through any of the existing dynamic DNS solutions for IP.
As an example, http://www.dyndns.com offers dynamic DNS (domain name server) services for dynamic IP addresses. In this way Nethunter server will connect to a unique DNS name resolution for your NVVR, but the dynamic DNS service will be redirecting that service to the IP that the NVVR may have anytime.

NOTE

As a recommendation, you have to setup the network speed considering the maximum bandwidth that your devices will generate, regardless of the amount of clients connected. This will ensure that Nethunter server will receive images, events from devices and all the needed data to keep the system working properly. On the other hand, setup clients network according to each client usage forecast.

Proxy & firewall configuration:

In case your network topology includes proxy servers or firewalls to improve security, it could limit some traffic in your network.
In this case it is really important to ensure that the server is able to view all the clients, DVR & NVR devices and cameras through all the ports and in both directions. In the case this is not really done, the system could have some unusual behavior such as video interruptions, PTZ controls not working, etc…

3 Nethunter client functionalities

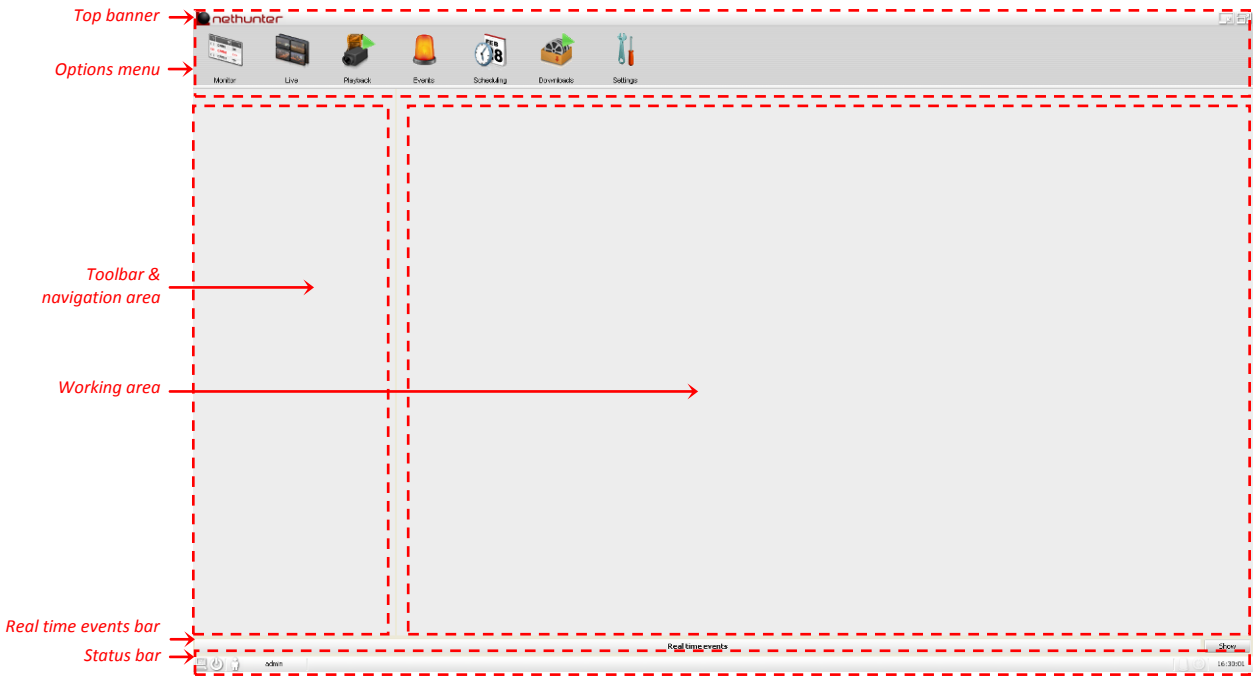
3.1 Login to Nethunter

When starting Nethunter client you must enter a *Username* and *Password* to enter the system. Each user can have different permissions in the application (see "users" section on settings chapter for more details).
The Nethunter *server* field allows you to connect, inserting the correct IP address, to a local or remote Nethunter server.
The default administrator user after installation is "admin" with an empty password and connecting to "127.0.0.1" server (server running on the same machine as the Client). At the login time (the first time the client starts) it is possible to choose a different server machine by just typing the new IP address or the server qualified network name.

When Nethunter client is started you can re-login again with another user but the server field will not be updatable. To change to another server the Nethunter client needs to be closed and started again.

3.2 Main screen

Nethunter main screen is divided into 4 main sections. Some of them will be always visible and the other ones will be present in almost all the application pages.
The system is user-friendly by using the same controls in all the application, such as menu options, icons or toolbars.
Since Nethunter is capable to support multiple display screens, the Main screen is shown in all of them when the client application starts. After startup, the mouse can be moved through all the connected screens that will be able to display different Nethunter options separately.
The main working areas of Nethunter are described on the following picture.



Top Banner

Area that displays the Nethunter logo, selected window name and the maximization & minimization buttons. These buttons allow to switch between "Normal" screen mode and "Windows® minimized" or an "Enlarged" mode that resizes the work area to fit the full screen size.

Minimize button (click it on the Windows® task bar to return to previous state)

Maximize button (pressing it again will return to normal screen mode)

Options menu

This is the main application menu that helps to navigate through all the application functionalities

Toolbar & navigation area

The common controls used in most of the screens will be displayed in this area. These controls allow to browse your logical devices structure, use "drag & drop" operations between navigation area and work area, use PTZ control when it applies, choose split views, or save personalized views, access remotely to DVR control panel, etc.

Real-time events bar

The events received from devices (in real time) will be displayed in this area. This control allows having information from event like Date Time, Device, Alarm type, Cameras ,their ips, and can show the live stream from the cameras causing the event by double-clicking on the event.

Real-time events

DateTime	Device	IP address	AlarmType	Cameras	Camera IP address
27/02/2012 11:48:48	NVVR	10.227.192.28	Rule alarm OFF		
27/02/2012 11:48:48	NVVR	10.227.192.28	Recording mode changed to scheduled	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:48	NVVR	10.227.192.28	External Stop recording	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:48	NVVR	10.227.192.28	Alarm OFF	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:46	NVVR	10.227.192.28	Alarm OFF	eCAM20007D801238E	10.227.192.154

Status bar

In the status bar there are some controls and also useful information that are always available to operators in normal screen mode.

About

By pressing this button a popup screen is opened and displays Nethunter version information.

This information is important to know your software version in case you need support or while upgrading your system.

Exit button

By pressing this button the client application will be closed. It may take a while to close if there are already running "scheduled tasks".

Change user button

With this button you can login as another user with a different profile.

At the right side of the user change button is displayed the currently connected user (admin in the example). Each client PC could have a different connected user.

Some user session screen layouts are kept between user sessions on the same PC (*live* splits configuration, etc.)

Scheduled task

This icon is highlighted each time a scheduled task is running. See the *Scheduling* section in order to know more about the different scheduled tasks.

13:38:55 ***Local date/time***

Client PC local date/time is displayed. This date does not necessarily match the server date or your devices date.
Date mismatches are acceptable in regionally distributed systems where the server is located in a different time region than the clients.

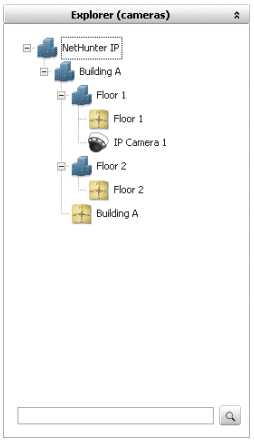
WARNING

It is highly recommended that the system date of all your components is correctly adjusted.
All the events generated by each device (including the server or the NVVR) will be stored with each machine or device local time.
Regionally distributed installations or devices may have time differences that need to be considered while monitoring the system.

3.3 Navigation components & toolbars

3.3.1 Explorer

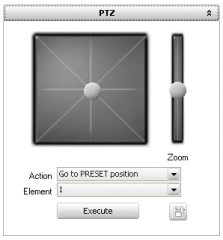
This component displays a navigation structure used in all the application to browse the different devices on the "logical" surveillance organization (the explorer structure is defined at the settings screen).



This structure will show different icons for devices, structure elements, maps, etc. and will be filtered depending on each screen or functionality. When the Explorer is filtered, in parenthesis you will see the filter criteria used on that screen. As an example, an explorer that is only displaying cameras will have a label: Explorer (cameras)

3.3.2 PTZ (Pan, Tilt, Zoom control)

This control allows moving a PTZ camera using the application interface from the *Live* and *Monitor* screens. Depending on the camera model capabilities, the available actions and amount of elements may differ from others.



This control will not appear for cameras that do not have PTZ functionality.

Pan, Tilt & Zoom controls

This manual control allows moving the camera to a target orientation and also changing the zoom level through the graphical components. It's also possible to perform some actions described below.

Use the zoom control to increase or decrease the zoom level.
This feature is also available using the external USB Joystick.

Actions

- Go to PRESET position: Moves the camera to a pre-saved position. There are up to 128 available presets depending on the PTZ device. This action is also available using the external USB Joystick.
- Execute SCAN: A scan is composed by: start angle, finish angle and moving speed. The camera will start moving from the starting angle to the finishing one with the set speed. It's defined in the camera.
- Start TOUR: A tour is a sequence of presets that are executed in a specified order. It's defined in the camera.
- Execute PATTERN: A pattern is a macro with camera movements programmed by the user. (Move + zoom + preset + zoom + …). It's defined in the camera.

Preset

The Preset component allows saving a new PTZ position into one of the Preset memory positions on the list. To save a new Preset PTZ position:

1. Move the camera with the PTZ control
2. Choose a Preset memory position from the "Element" drop-down list
3. Press the Save button

To retrieve a PTZ preset, select the element from the dropdown list and press the Load button.

NOTE

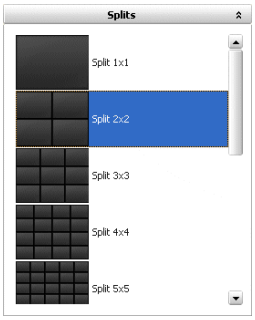
Depending on the device type, the amount of operations that can be performed with this control and also the sensitivity of each movement may be limited or may not be possible. In such cases this control won't do anything.
In Axis models the element list shows custom configuration information (defined in camera Web configuration).

WARNING

If a PTZ action is being performed, It will be overridden by any new PTZ action executed.
When the new one finishes, the old one won't go on being executed.

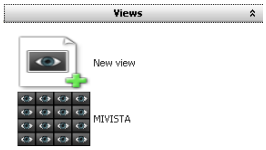
3.3.3 Splits

Selectable splits template for viewing video on the working area.
The splits list is configured through the settings screen and is fully customizable by the administrator. This is considered a server component and any change will be visible for all the system users.



3.3.4 Views

When a split is configured with cameras inside of it, it can be saved as a predefined “View”. You can create as many views as you need, and also see views that others created on the system.
Follow the steps below to create a new view:



1. Choose a split layout from the splits panel.
2. “Drag & drop” the cameras from the *Explorer* to the *Split cells.*
3. Move the mouse over the “*New View*” area on the *Views* panel
4. Click on the floppy disk icon on the Views panel and type a name for the view.

The views can be modified and saved again at any time by pressing the floppy diskette icon on the view configuration, or deleted by pressing the “X” icon.

It’s possible to watch different Views sequentially by pressing the button “Views sequence”. A sequence will start iterations through the available views with the specified sequence time (in seconds).

3.4 System monitor

Currently-connected devices are listed showing their status. From this view, the system connectivity health is immediately displayed and monitored.
When a device is disconnected, the status text will be displayed in red text to make it easier to be identified.

The devices list is filtered by the left explorer hierarchy tree. After selecting a branch, the right side devices will be immediately filtered.

Through the “Incidences” checkbox it is possible to filter devices with connectivity errors, not licensed or disk full. In those cases, the status is displayed in red color.
All columns allow descending or ascending sorting by clicking on them.

Live Device: This is the name of the live device that contains a specific camera.
Playback Device: This is the name of the recorder device that contains a specific camera. If an IP camera is not configured to be recorded into any IP recorder device, this field won’t be available.
Name: Qualified device name which is defined by the operator when setting up the system.
Location: Virtual path from the selected Explorer tree node to the camera virtual position on the explorer tree. The first path position is displayed at the top of the devices list.
Live status: Shows the current live status. The meaning of this field is different according to the device. See the table below.

NVR	NVVR	DVR	IP camera	Analog camera
n/a	Connected or Disconnected	Status of the device *	Connected or Disconnected.	The same status as the DVR which it belongs to.

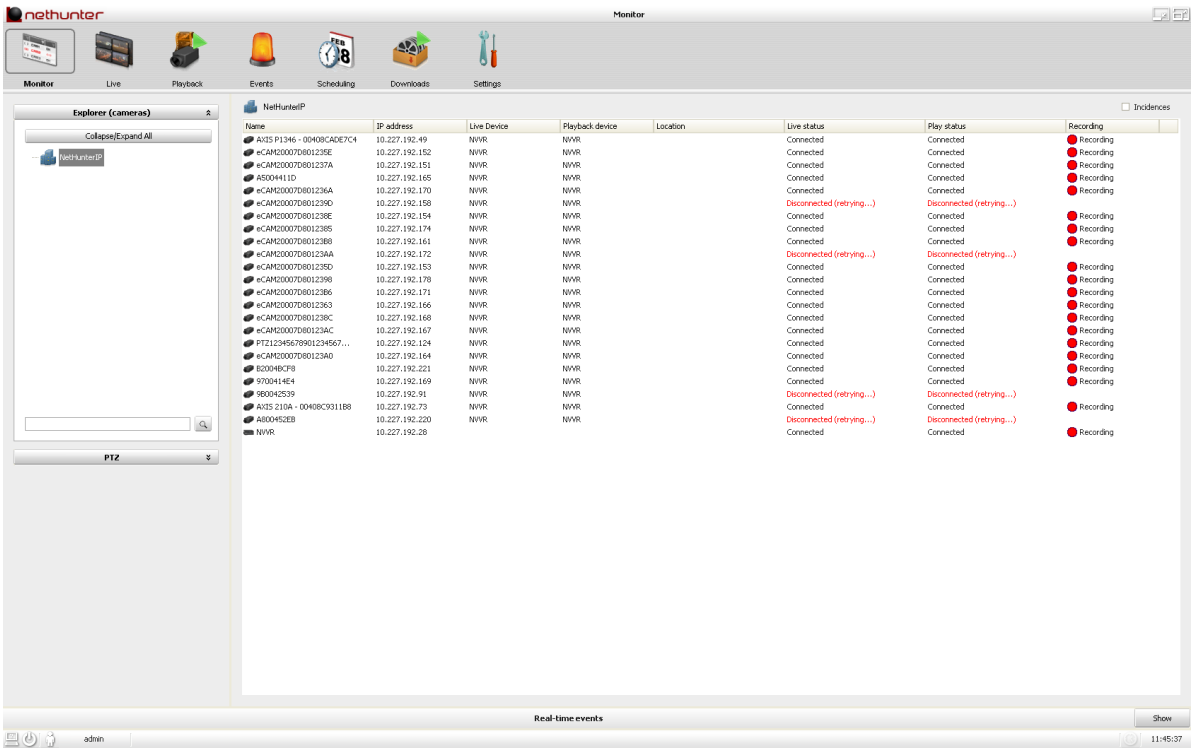
**** Check out the manual of your devices to know the possible status values***

Play status: Shows the current play status. The meaning of this field is different according to the device. See the table below***.***

NVR	NVVR	DVR	IP camera	Analog camera
Status of the device *	Connected or Disconnected	Status of the device *	The same status as the NVR or NVVR which it belongs to.	The same status as the DVR which it belongs to.

**** Check out the manual of your devices to know the possible status values.***

Recording: Icon indicator for recording status of the device. When the icon is in red color means that the device is being recorded.
Some devices (DVR) are not able to notify individually the cameras that actually recording. In this case the recording icon appears in orange; since it is not sure that the camera is being recorded (depends on DVR settings).


nethunter
Monitor
Monitor
Live
Playback
Events
Scheduling
Downloads
Settings
Explorer (cameras)
Collapse/Expand All
NetHunterIP
PTZ
NetHunterIP
Incidences
Name
IP address
Live Device
Playback device
Location
Live status
Play status
Recording
AXIS P1346 - 00408CADE7C4 10.227.192.49 NVR NVR Connected Connected Recording
eCAM20007D801235E 10.227.192.152 NVR NVR Connected Connected Recording
eCAM20007D801237A 10.227.192.151 NVR NVR Connected Connected Recording
A5004411D 10.227.192.165 NVR NVR Connected Connected Recording
eCAM20007D801236A 10.227.192.170 NVR NVR Connected Connected Recording
eCAM20007D801239D 10.227.192.158 NVR NVR Disconnected (retrying...) Disconnected (retrying...)
eCAM20007D801238E 10.227.192.154 NVR NVR Connected Connected Recording
eCAM20007D8012385 10.227.192.174 NVR NVR Connected Connected Recording
eCAM20007D80123B8 10.227.192.161 NVR NVR Connected Connected Recording
eCAM20007D80123AA 10.227.192.172 NVR NVR Disconnected (retrying...) Disconnected (retrying...)
eCAM20007D801235D 10.227.192.153 NVR NVR Connected Connected Recording
eCAM20007D8012398 10.227.192.178 NVR NVR Connected Connected Recording
eCAM20007D80123B6 10.227.192.171 NVR NVR Connected Connected Recording
eCAM20007D8012363 10.227.192.166 NVR NVR Connected Connected Recording
eCAM20007D801238C 10.227.192.168 NVR NVR Connected Connected Recording
eCAM20007D80123AC 10.227.192.167 NVR NVR Connected Connected Recording
PTZ123456789012345678... 10.227.192.124 NVR NVR Connected Connected Recording
eCAM20007D80123A0 10.227.192.164 NVR NVR Connected Connected Recording
B2004BCF8 10.227.192.221 NVR NVR Connected Connected Recording
9700414E4 10.227.192.169 NVR NVR Connected Connected Recording
9B0042539 10.227.192.91 NVR NVR Disconnected (retrying...) Disconnected (retrying...)
AXIS 210A - 00408C9311B8 10.227.192.73 NVR NVR Connected Connected Recording
A800452EB 10.227.192.220 NVR NVR Disconnected (retrying...) Disconnected (retrying...)
NVR 10.227.192.28 Connected Connected Recording
Real-time events
Show
admin
11:45:37

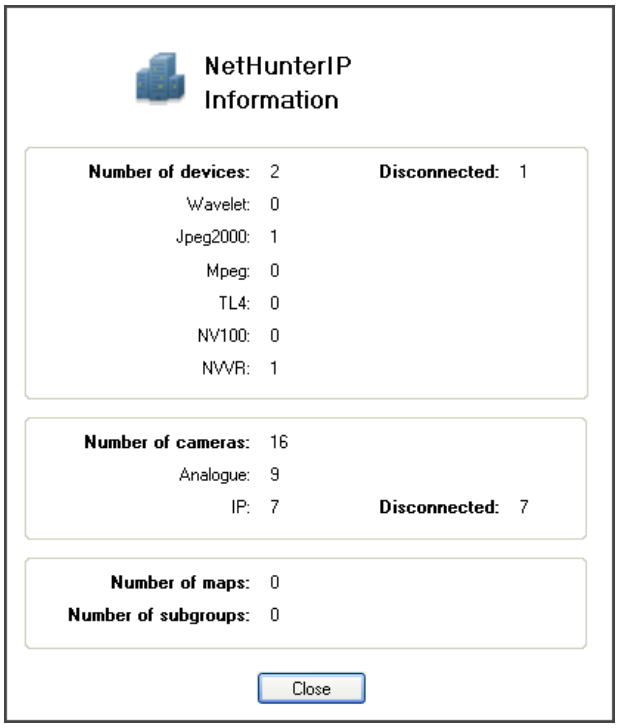
3.4.1 Context menu (right mouse button)

A context menu is shown by clicking the right-button on any device in the list. The available options are:

- Remote control. Users can control dvr functions remotely. When this option is selected , the dvr front panel will be shown in the bottom of the screen and manual interaction will be possible as if you were in front of it. Only available on dvrs.
- Restart IP camera. The selected IP camera is restarted. Only available on IP cameras.
- Connect DVR. The selected dvr is connected. Only available if the dvr is disconnected.
- Disconnect DVR. The selected camera is disconnected. Only available if the dvr is connected.
- Connect all DVRs. All disconnected dvrs are connected. Only available when clicking on any dvr.
- Disconnect all DVRs. All connected dvrs are disconnected. Only available when clicking on any dvr.

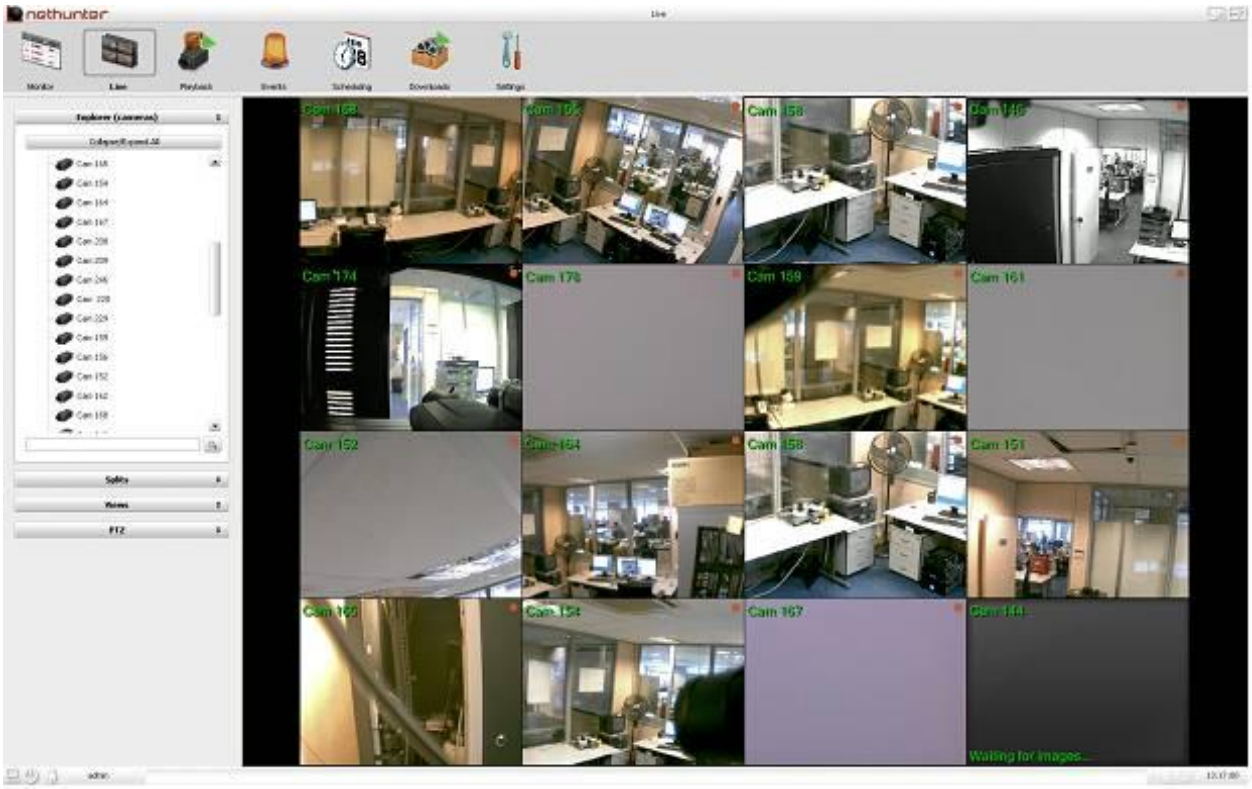
3.4.2 Groups / Folders information

Each group contains information about how many devices, maps and subgroups are contained under it. In order to get that information, double-click on any group. See an example below.



3.5 Live

This screen allows watching live video images (in real time) from any camera connected to the system. By some easy steps the splits working area can be populated with cameras.
Some of the main functionalities include viewing cameras, “drag & drop” operations between different screen components, explorer navigation and filtering, PTZ control, maps navigation, create personalized views or choose existing views and splits layout selection.



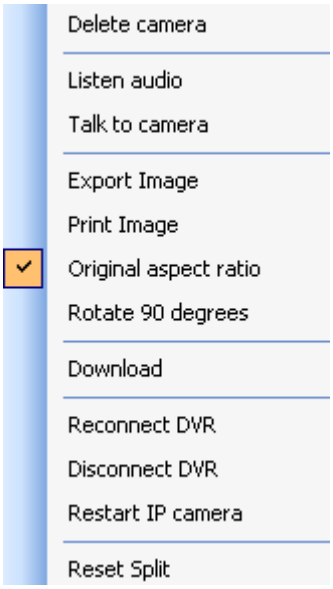
The main screen area is divided into splits. Each split is a cell that grants “drag & drop” a camera into it to start viewing the camera video stream.
Once a camera is assigned to a split cell, Nethunter connects to it. Depending on the camera model or camera recorder device it could take some seconds to start receiving live images (in the meantime the text “Connecting…” will be displayed)
“Drag & drop” operations are allowed into the splits main area to swap cameras between split cells. Also “drag & drop” operations are available to include cameras into the splits area from the cameras *explorer.*
It is also possible to “drag & drop” a group of cameras or a complete tree structure just selecting the explorer node and drop in one split cell on the working area. The first camera will be displayed on the selected split and the other cameras will be visible on the following ones.
It is also possible to maximize just one split cell by double-clicking it directly with the mouse. Double-clicking it again the video will come back to the original state in the multi-cell split view.

3.5.1 Context menu (right mouse button)

In the splits main area it is possible to call a context menu by clicking the right-button over a split cell.
The available options are:

- Delete camera. The selected camera is deleted from the split.
- Listen audio / Stop audio. Only working on UDPTech IP cameras and on the main screen. Read the “Live audio streaming” section for more info.
- Talk to camera / Stop talk. Only working on UDPTech IP cameras and on the main screen. Read the “Live audio streaming” section for more info.
- Export Image. Current image is exported to BMP or JPG with extra information (camera name and date/time)
- Print Image. Current image is printed with extra information (camera name and date/time)

- Original aspect ratio. Images are shown with their original aspect ratio. If unchecked, the images are streched to the splits aspect ratio. By default, on dvrs this setting is unchecked and on ip cameras is checked.
- Rotate 90 degrees : Images are rotated 90 positive degrees in the clock-wise direction. This command is disabled when the image is zoomed in. In that case, a complete zoom out must be carried out in order to rotate.
- Download. Opens the quick downloads window. Read the "Quick downloads" section for more info. This option can be enable or disable by using NH user rights.
- Reconnect DVR. The dvr of the selected camera is reconnected. Only available is the dvr is disconnected.
- Disconnect DVR. That dvr of the selected camera is disconnected. Only available is the dvr is connected.
- Restart IP camera. The selected IP camera is restarted. Only available on IP cameras.
- Reset split : In some rare cases, MPEG/H264 decompressor might fail and show distorted images. In those cases, click on this option to recover images.



3.5.2 Split text information and indicators

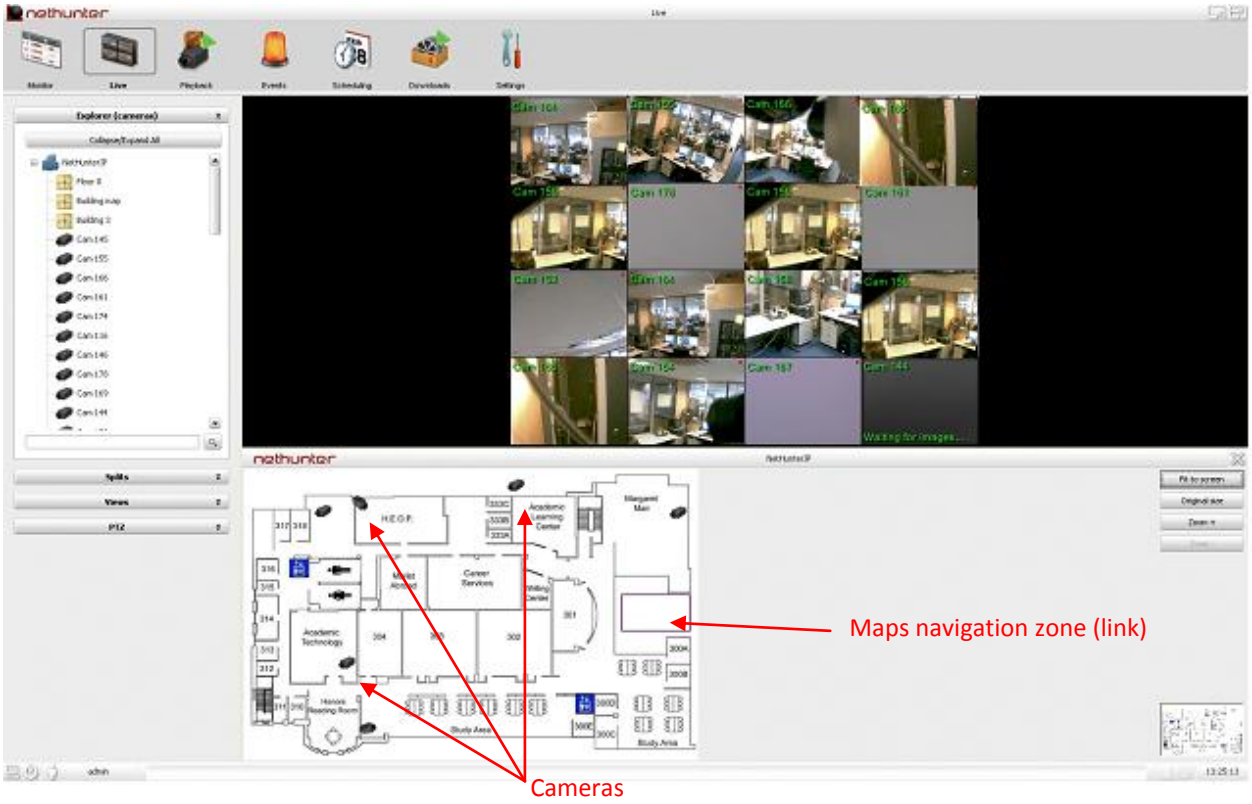
Each split cell shows the camera name at the top-left corner by default. The position (top-left or bottom-left) can be configured in the main application settings.
The text font size is automatically scaled depending on the split size and also on the screen resolution. Though, the font size can be configured in the main application settings.
The camera status is displayed on the top-right corner. When a camera is recording, a "red" round icon is shown. In case of DVR cameras the icon is in "orange" which indicates that the DVR is in a recording state, but without exact information on which specific cameras are being recorded. Any DVR camera may be recorded at that time depending on internal DVR configuration (check the DVR remote configuration "recording" settings).
There are several possible messages:

- Waiting for images: This message appears between the time when a camera is dropped on a split and the time the split cell starts showing live images.
- Buffering: This message appears when a camera is being watched in a live split and the client stops receiving images from it for a while.
- Disconnected: This message appears when a camera, or the device which contains it, is disconnected.
- Recovering device: This message appears when a camera has been disconnected and reconnected again but no live images have arrived yet.
- Locked: This message appears when a "Deny live actions" schedule is programmed for that IP camera.

3.5.3 Maps

In the live screen, it is possible to display maps that can include navigation areas and cameras. It is possible to "drag & drop" cameras from the map to any split cell in the working area to see the camera live stream.

Maps are user's images that must be set up from the settings screens. The supported image files are: BMP, GIF, JPEG, PNG, TIFF, WMF and RLE.
A map is placed in the folder that is selected in the moment of creating a map.
It's necessary to click on the map to use it in the Live screen.
A map can be resized, zoomed-in and out, or adjusted to fit the screen. The map area can be resized or closed by the user.



There is a possibility to have links (navigation areas) to other maps into a displayed map. These areas could be selected and the new map will be loaded. When moving the mouse over a link area (navigation), it will change to a different color and the name of the destination linked map will be shown on it.

To close the map, just click the "X" icon top right corner or the map component sub-window.

3.5.4 Sequences

It's possible to watch different Views sequentially by pressing the button "Views sequence".
A sequence will start iterations through the available views with the specified sequence time (in seconds).

To configure a sequence, it's necessary to create more than one View and set an interval time in the range of 2-99 seconds.

3.5.5 Digital zoom

It's possible to perform digital zoom on Live images. Firstly, click on the area you want to zoom. After that, zoom in by moving the mouse scroll wheel ahead and zoom out by moving it back. Move the zoomed images in whatever direction by holding the third button of the mouse clicked, moving the mouse and releasing the button.

3.5.6 Live audio streaming

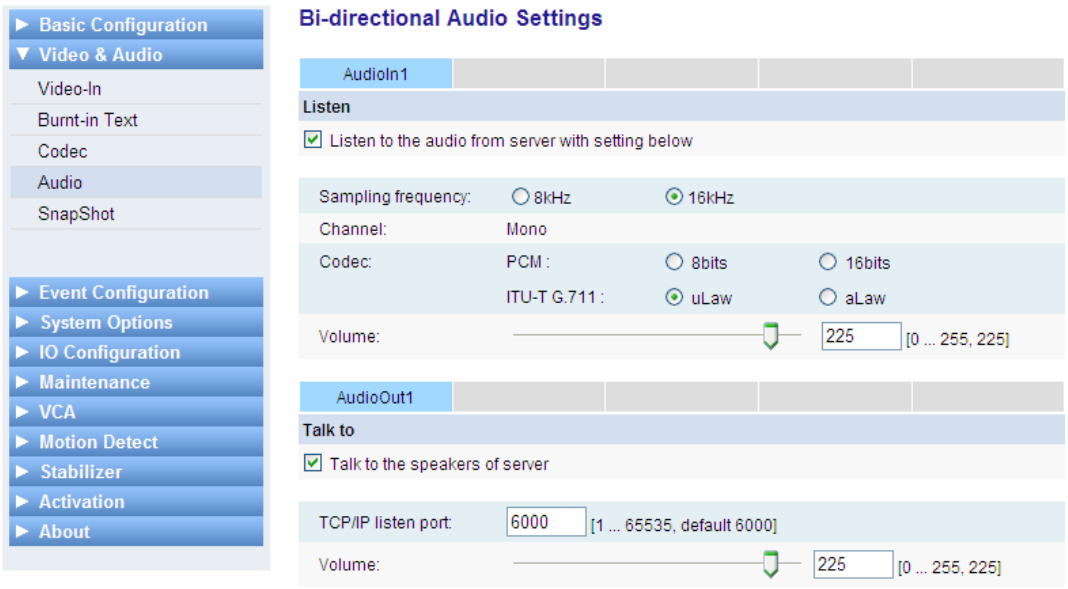
Users can stream or listen live audio to/from any UDPTech device. For streaming audio, the standard PC audio input is used. For listening audio, some PC speakers are needed. Check that your PC audio settings are properly configured.

In order to open the speech channel, users must select the option "Talk to camera" in the Live context menu. When the speech is finished, the "Stop talk" option must be selected.

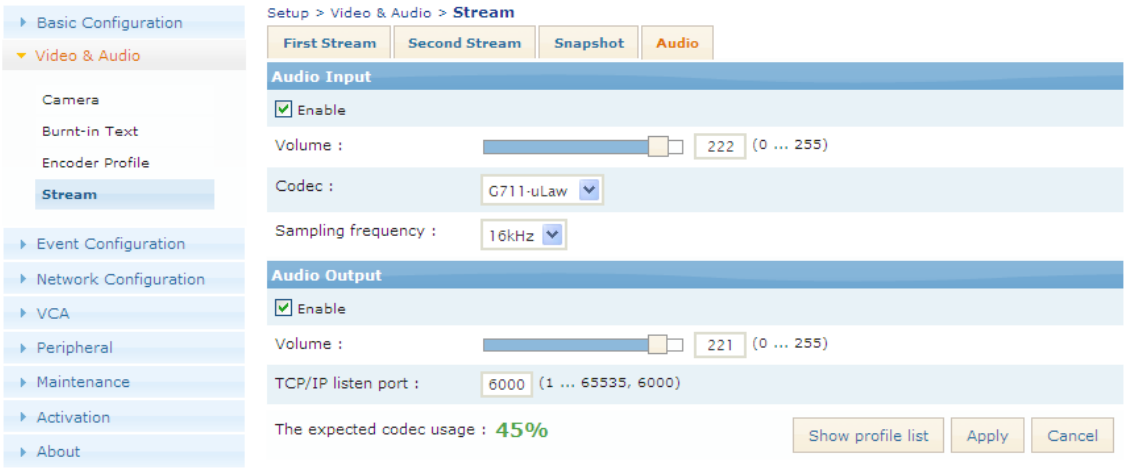
In order to open the listen channel, users must select the option “Listen camera” in the Live context menu. When users don’t want to listen audio anymore, the “Stop listen” option must be selected.

Refer to the specific device installation guide for getting the technical knowledge about how the audio connections to the camera must be wired.

On IPE devices, the audio settings must be configured at 16 kHz and the codec must be the “uLaw”. Moreover, the listen and talk options must be checked. See more details in the screenshot below :



On IPX/IPN devices, the sampling frequency must be set at 16 khz. Moreover, the audio input and output options must be checked. See more details in the screenshot below :



3.5.6.1 Icons when broadcasting audio

When any IP camera is broadcasting audio, it's possible to show icons warning users about it. Beside them, the name of the camera is shown.
In order to enable it, the value of an internal parameter has to be set to "True". To do so, follow the next steps :

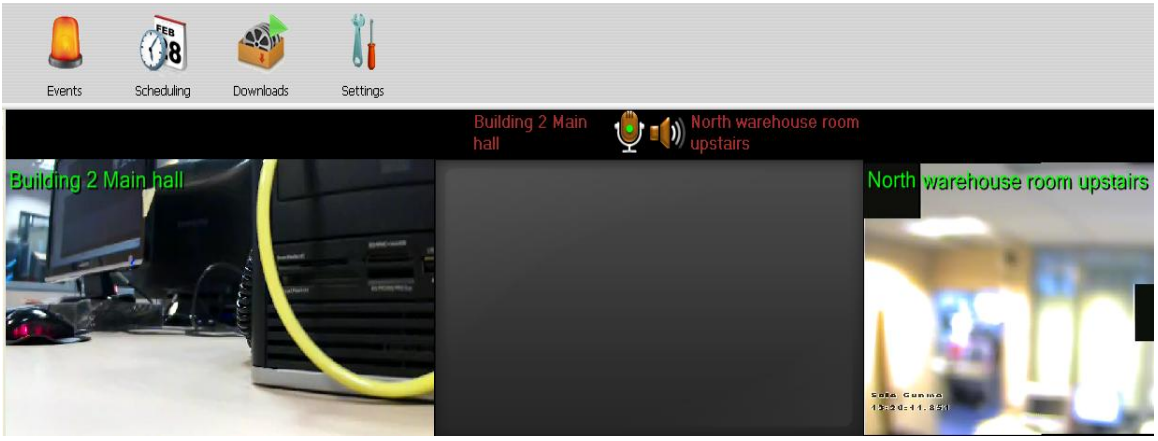
1 – Stop NHClient
2 – Open the file NHIPclient.exe.Config by using any text editor. This file is saved in the NH installation folder
3 – Change the value of the parameter "AudioIconsAreVisible" to "True"
4 – Close and save the file NHIPclient.exe.Config
5 – Start NHClient

```
<add key="SinglePanelExpanded" value="False" />
<add key="KeepDVROriginalAspectRatio" value="False" />
<add key="KeepIPCamOriginalAspectRatio" value="True" />
<add key="AudioIconsAreVisible" value="True" />
<add key="AutoLogOffEnabled" value="False" />
```

When this parameter is set to "True", the splits size is reduced so camera images will be shown smaller.

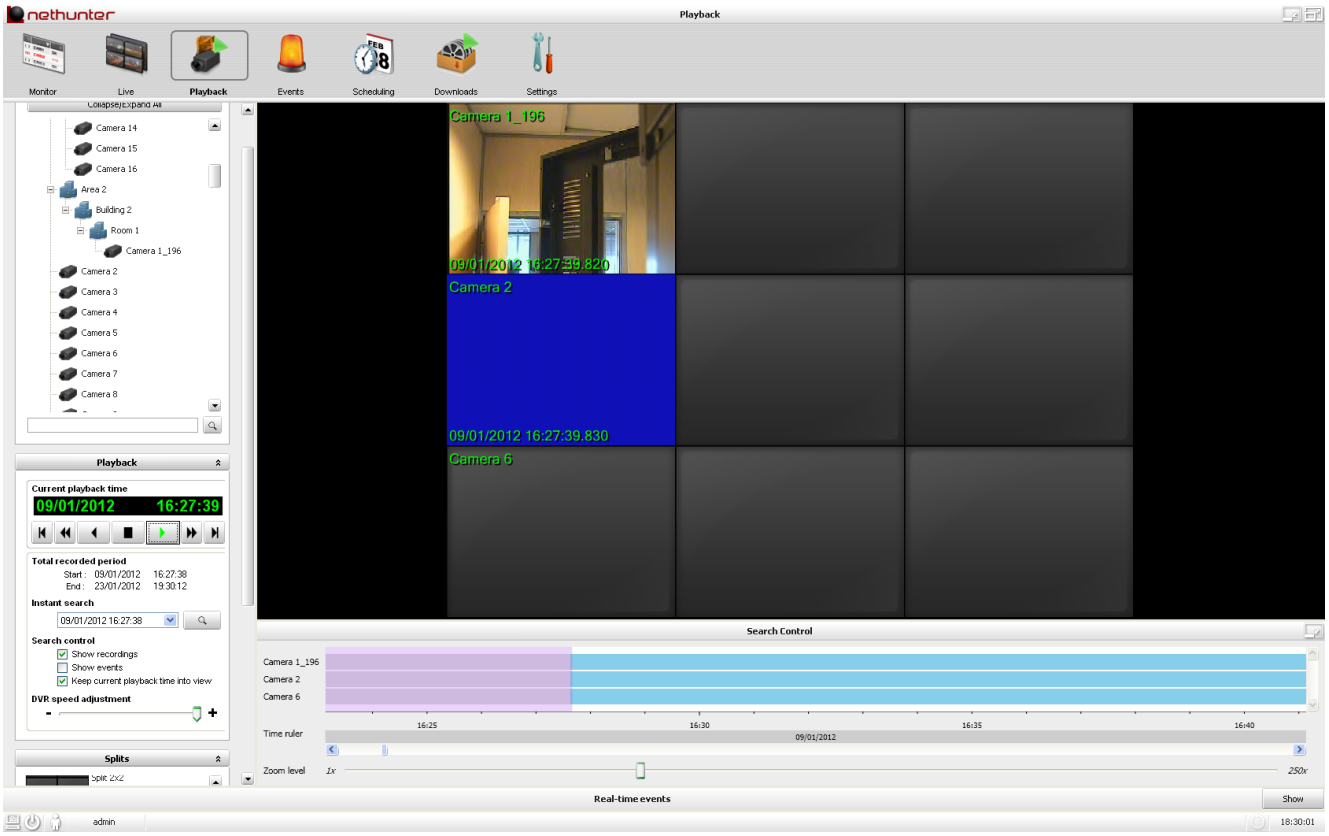
WARNING
The file NHIPclient.exe.config is a very important configuration file. If there is any mistake on it, NHClient might stop working. Edit it carefully. Don't change any value unless your distributor tells you so. It's recommendable to make a backup previously.

The audio icons and the camera names are shown on the top of the splits. See in the picture below how they look like.



3.6 Playback

This section is used to play recorded video from any device (IP cameras in an NVVR, DVR or NVR). The screen layout is almost identical to the live one, with the capability to configure the splits layout and also to "drag & drop" cameras from the Explorer structure.



You can "drag & drop" multiple cameras from different DVR and also IP cameras. Also, Nethunter allows multiple cameras playback simultaneously. It is not possible to playback different DVR, NVR or NVVRs simultaneously in the same split layout due to different timestamps.

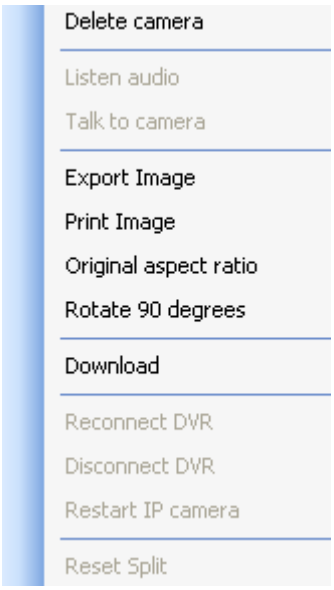
When clicking in a camera frame in the splits area, all the cameras belonging to the same recorder will be selected and the other ones from other devices will be disabled.
After selecting a camera, Nethunter will immediately search for the recorded periods of that camera.
The playback control will show the date of the first and the last recorded frame of all the selected cameras.

3.6.1 Context menu (right mouse button)

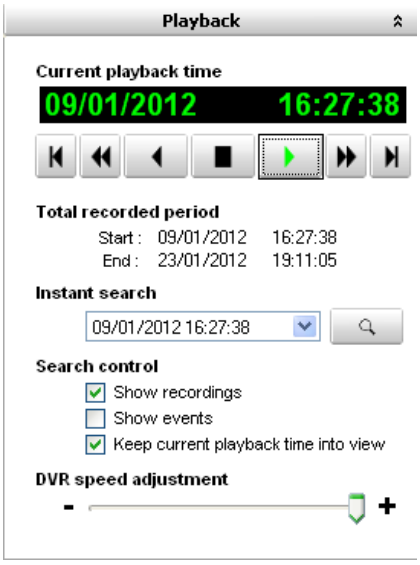
In the splits main area it is possible to open a context menu by clicking the right-button over a split cell.
The available options are:

- Delete camera. The selected camera is deleted from the split.
- Listen audio. Only available in Live.
- Talk to camera. Only available in Live.
- Export Image. Current image is exported to BMP or JPG with extra information (camera name and date/time)
- Print Image. Current image is printed with extra information (camera name and date/time)
- Original aspect ratio. Images are shown with their original aspect ratio. If unchecked, the images are streched to the splits aspect ratio. By default, on dvrs this setting is unchecked and on ip cameras is checked.
- Rotate 90 degrees. Images are rotated 90 positive degrees in the clock-wise direction. Images are rotated 90 positive degrees in the clock-wise direction. This command is disabled when the image is zoomed in. In that case, a complete zoom out must be carried out in order to rotate.

- Download. Opens the quick downloads window. Read the "Quick downloads" section for more info. This option can be enable or disable by using NH user rights.
- Reconnect DVR. Only available in Live.
- Disconnect DVR. Only available in Live.
- Restart IP camera. Only available in Live.
- Reset split. Only available in Live.



3.6.2 *Search & play controls*



The **Playback control** allows searching, zooming the playback time frame, navigating and playing forward and backwards any recorded video.
The top level button controls are the same as a standard video or media player to allow seeking the video up to the beginning or to the end of all the recorded periods. Fast forward and backward are available too. Each device offers a different maximum speed.

The option *"**Instant search**" allows to* locate a specific timestamp to start playback operations.

When the **"Show recordings"** and the **"Show events"** options are checked, the recordings and the events respectively are shown in the Search Control. These two options are only enabled when no playback is being performed.
When the **"Keep current playback time into view"** option is checked, the Search Control will always show the current date and time in the timeline.

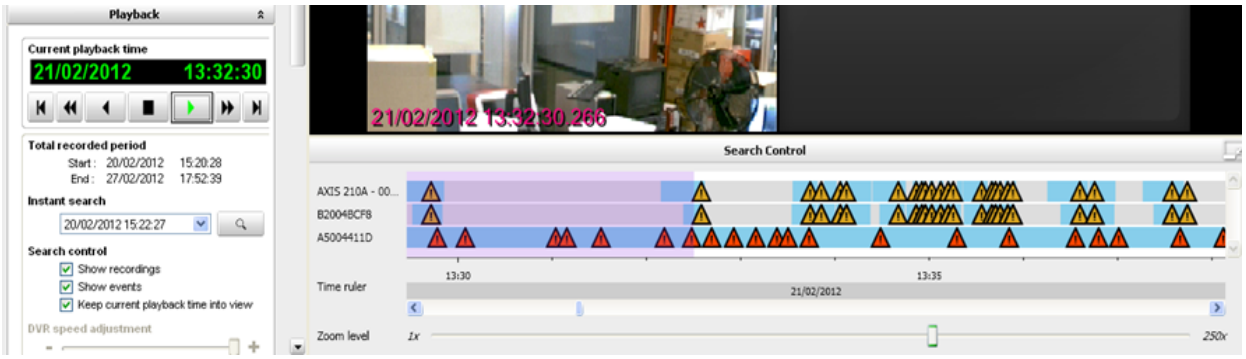
NOTE

In order to see the events of any device, the "Get events" command must be executed previously on that device. This requirement does not apply on NVVR devices.
When clicking on "Show events" not all the events are shown in the Search Control but only the next 10000 events in the next 24 hours after the current playback time.

The **Search control** provides information about the recorded periods and the events.
To fine tune the search through the timeframe slide bar, you can zoom-in and zoom-out it by moving the zoom slide bar. While moving, pay attention to the timeframe start and end date. After zooming the timeframe you can move smoothly the slide bar.

Through the current playback time slide bar you can seek any recorded period and start playing in any direction. In certain devices, by moving the slide bar, Nethunter will seek the closest recorded period to the selected timestamp.

When moving the mouse over the events, detailed info about the events will be shown in a pop-up window.



NOTE

Each device publishes different recording and event information.
Regarding recordings, the NVVR publishes all the recorded periods. However, the rest devices only publish the start and the end period.
Regarding events, each device has different event categorization and internal codes. The shown events in the Search Control are "Alarm received", "Start recording" and "Settings changed" (the last one only on the NVVR).

3.6.3 DVR Speed adjustment

In case of playing DVR recorded video, you can change the playback speed at your convenience by moving the slide bar. Depending on the DVR model, network speed and Nethunter playback layout and configuration, the video may play faster than real-time.

3.6.4 Digital zoom

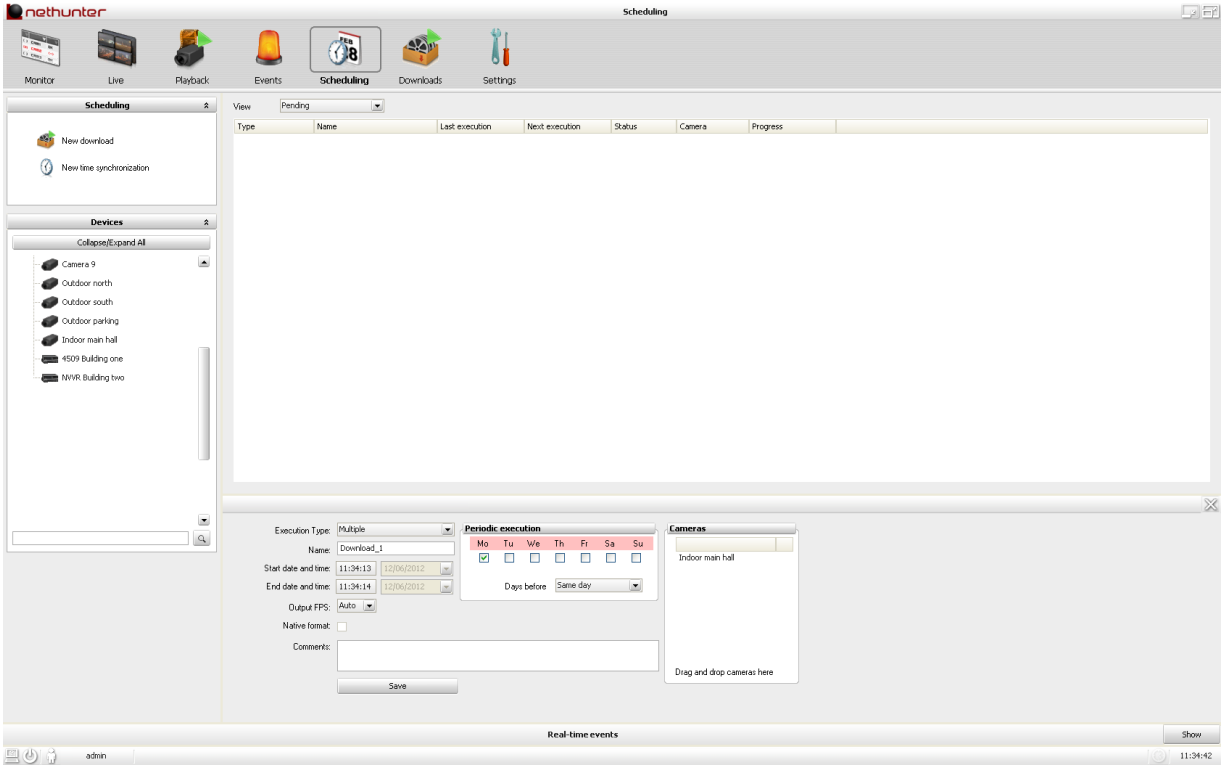
It's possible to perform digital zoom on Playback images. Firstly, click on the area you want to zoom. After that, zoom in by moving the mouse scroll wheel ahead and zoom out by moving it back. Move the zoomed images in whatever direction by holding the third button of the mouse clicked, moving the mouse and releasing the button.

3.7 Scheduling

Scheduling screen is used to program two different types of tasks in the Nethunter server. The scheduled tasks will be based on Nethunter server time activity.
It is important to know that these downloads are scheduled at Client PC level. Each PC could have different scheduled downloads to execute.

3.7.1 Downloads (New download)

Download recorded video between two different dates to a local file. It is possible to download different cameras from different devices. The format of the downloaded video file can be chosen between : native format (only available on dvrs) and not native format (available on all devices. It's possible to choose between AVI or MKV as different destination encoding format according to the settings "Format" in Settings → General). The column "Progress" will show the progress percentage of the download.



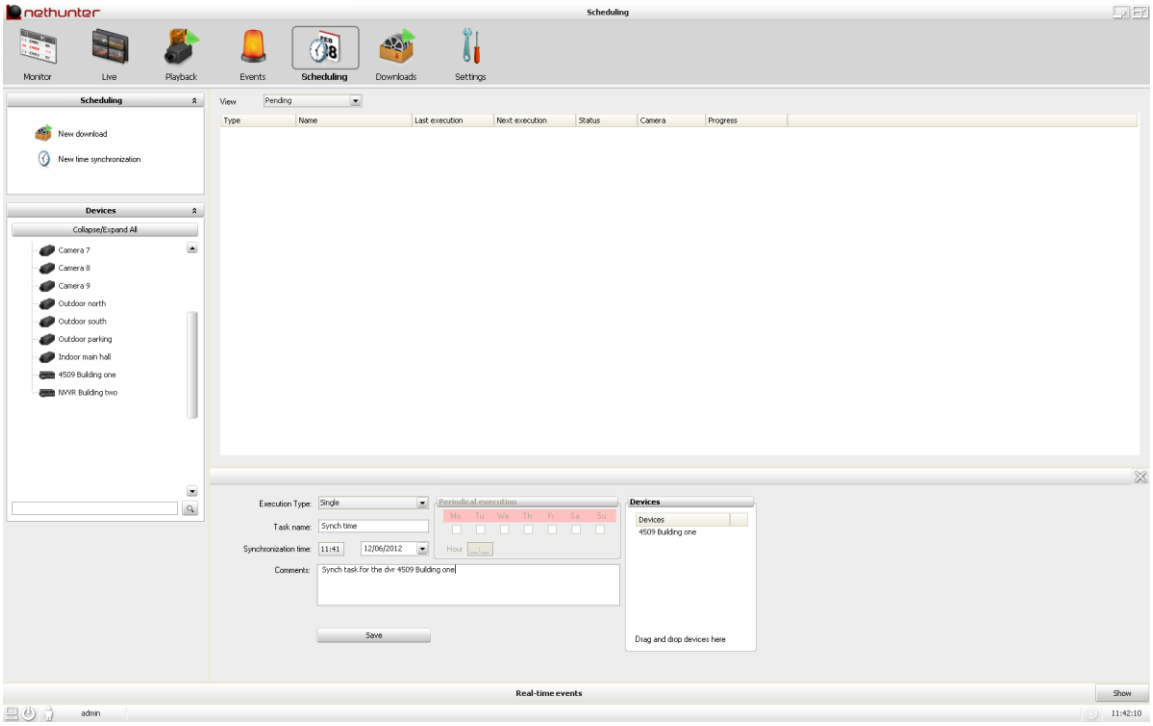
WARNING
Downloaded video is recorded on the NHClient PC. The required disk space per each camera depends on the downloaded period and on the video format provided by the device (MPEG-4, H.264 …). *Please, check the free disk space and disk size specifications before downloading video to ensure that you will have enough space available. Otherwise these downloads will fail.* *Downloads are high-CPU usage tasks. In case CPU usage gets close to 100%, frames will be discarded in order to avoid PC collapse. In order to avoid this situation, it's recommendable not to schedule many tasks simultaneously and to avoid executing other high-CPU usage tasks on the same PC at the same time (like Live).* *Downloads are executed by NHClient. If this module is closed or control is taken while any download is being executed, that download will be restarted from the beginning when NHClient is launched again or control is released respectively.*

NOTE

If NHClient is closed abnormally and a download task is being peformed, once NHClient is restarted the task will resume from the beginning.
If NHClient is closed properly and a native format download task is being performed, once NHClient is restarted the task will resume from the last downloaded time. However, a non-native download will resume from the beginning.
If the logged user is changed and a download task is being performed, the task will resume from the last downloaded time.

3.7.2 Time Synchronization (New time synchronization)

This utility synchronizes the DVR internal clock (date/time) with the server date.
It is recommended to schedule a periodical time synchronization task for DVR devices.
It's possible to synchronize multiple DVRs in the same task.
This functionality is only available for DVR devices.



3.7.3 Scheduled tasks list content

On the right hand there is a list of scheduled tasks. Each task has an entry on that list showing its main execution parameters and status.
The schedule possible statuses are the following ones:

- ***"Stopped":*** means that it is not yet executed (for the first time) or that it will be re-executed again since it is a periodical execution. Check the "Next execution" date to know when it will be executed for the next time.
- ***"Running":*** means that the task is being executed at this time.
- ***"Finished":*** means that the download has been executed and finished. It will disappear from the screen immediately (unless the filter "All" is applied) and it will appear in Downloads screen.
- ***"Trying":*** means that Nethunter is trying to request for the images.

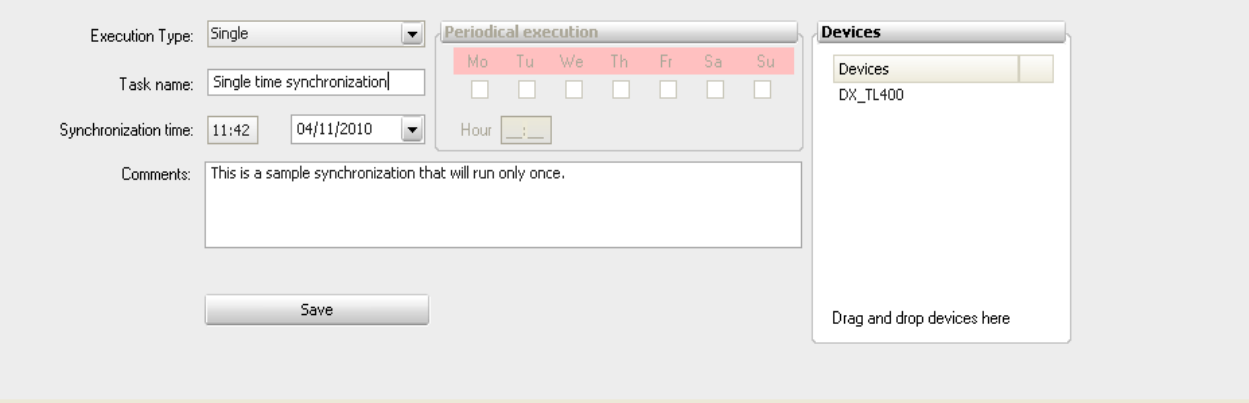
To filter the scheduled tasks list there is drop-down list filter with two possible values:

- **"Pending"**: Tasks that will be executed one or repeatedly.
- **"All"**: Tasks including the completed ones that will not be executed anymore.

To check a schedule task detail you can "double-click" it and below will appear all the scheduling details. It is read-only panel once the schedule is created.
To delete a schedule task from the system, right-click on the task and select the option "Delete".

3.7.4 The time scheduling component

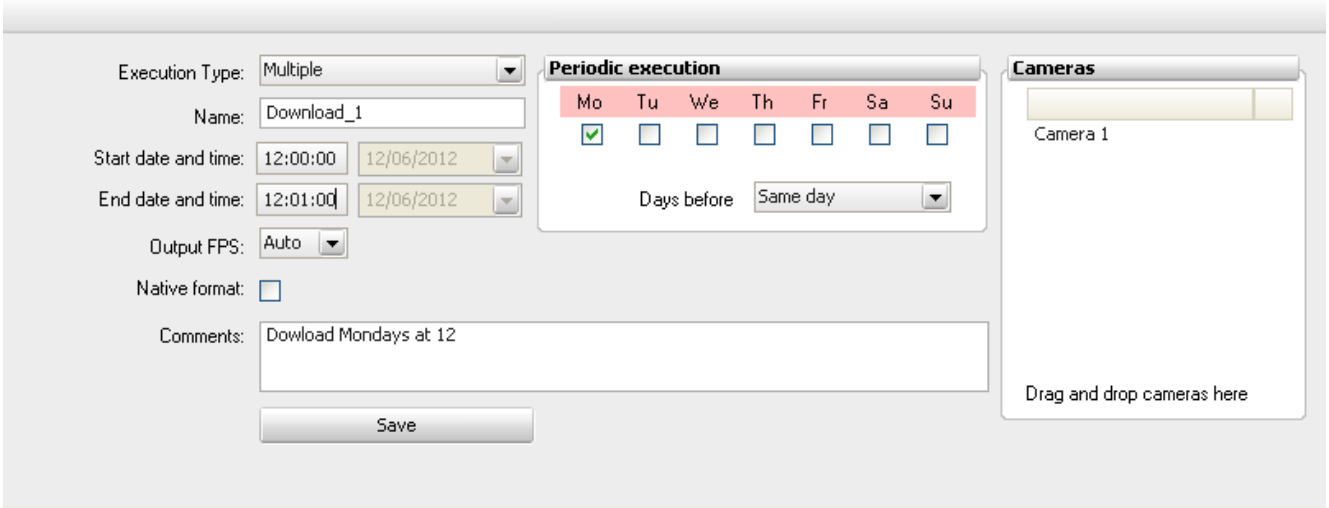
When a new schedule is created, a new screen area is enabled, allowing the user to configure a schedule with the following information:



1. Choose the execution type (single or multiple) and choose the date or week days and the time that the execution will take place.
2. Assign a task name to identify the task on the tasks list.
3. "Drag & drop" the DVR devices that you want them to be synchronized, from the left side devices explorer tree. You can drop multiple DVR devices from different models. All of them will be included in this time synchronization task.
4. (Optional) Type a description for your scheduled task in the comments field.
5. Press the "Save" button.

3.7.5 The download scheduling component

In the case of a new download schedule, this other component is displayed (similar to the previous one) but with different behavior:



1. Choose the execution type (single or multiple).
2. Assign a task name to identify the task on the tasks list.
3. Type a duration time for the export in seconds or minutes.
4. Choose the date or week days and time that the execution will take place (depends on execution type).
5. Select the date of the video that will be exported. You can export video of the selected schedule day “current day” or you can export video from one to 6 days before, at the specified Hour.
6. “Drag & Drop” one or more cameras (Analog and IP) to download a selected video period. If there is no video to export, no video file will be generated (See downloads section for more information on download results). It’s possible to drag & drop devices. In that case, all their cameras will be added in the list.
7. Select the desired output FPS for the exported video. If it’s set to Auto, the output FPS will be automatically detected.
8. (Optional) When the parameter “Native format” is checked, the download will be created by using the native format of the dvr. In that case, the “output FPS” list will be disabled. This option is only available on dvrs. In this kind of downloads, all the selected cameras must be recording in the same dvr. See the section “Native format downloads” for more info.
9. (Optional) Type a description for your scheduled task into the comments field.
10. Press the “Save” button.

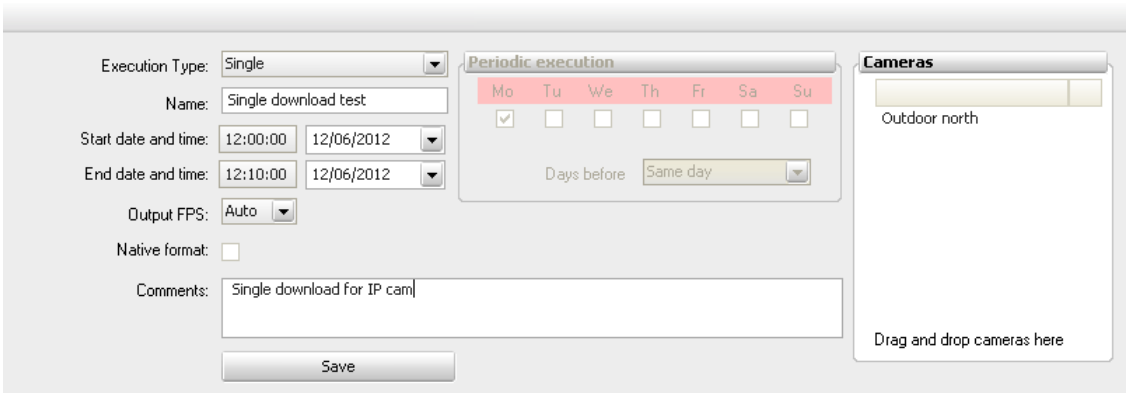
NOTE

The output framerate is calculated as the average in case of downloading a footage with variable fps.

3.7.6 Scheduling examples

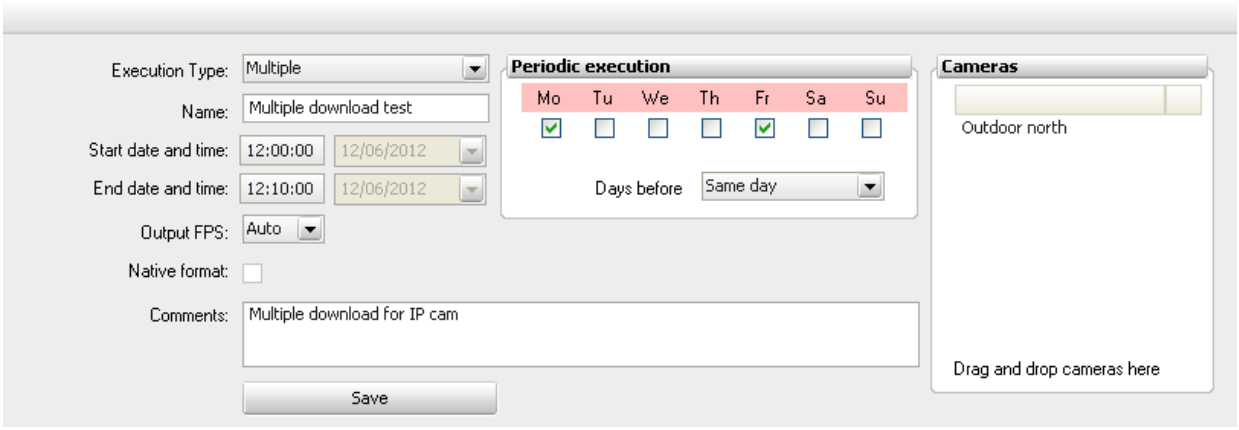
Example 1: Single download

We would like to download 10 minutes from November 4th, at 00:00h from an IP camera.



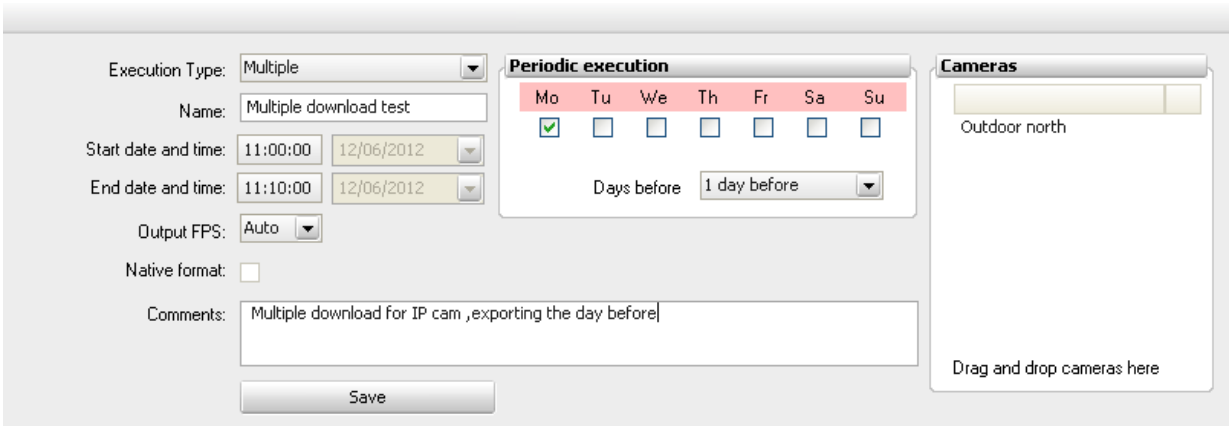
Example 2: Multiple download

Download video periodically. The downloaded video will be on Monday and Friday, starting at 12:00 am and will export 10 minutes of video for an IP camera.



Example 3: Multiple download for one day before

Download video periodically. Each Monday morning we want to export the Sunday video from 11:00h to 11:10h. In this case we have to use the days offset parameter ("one day before").

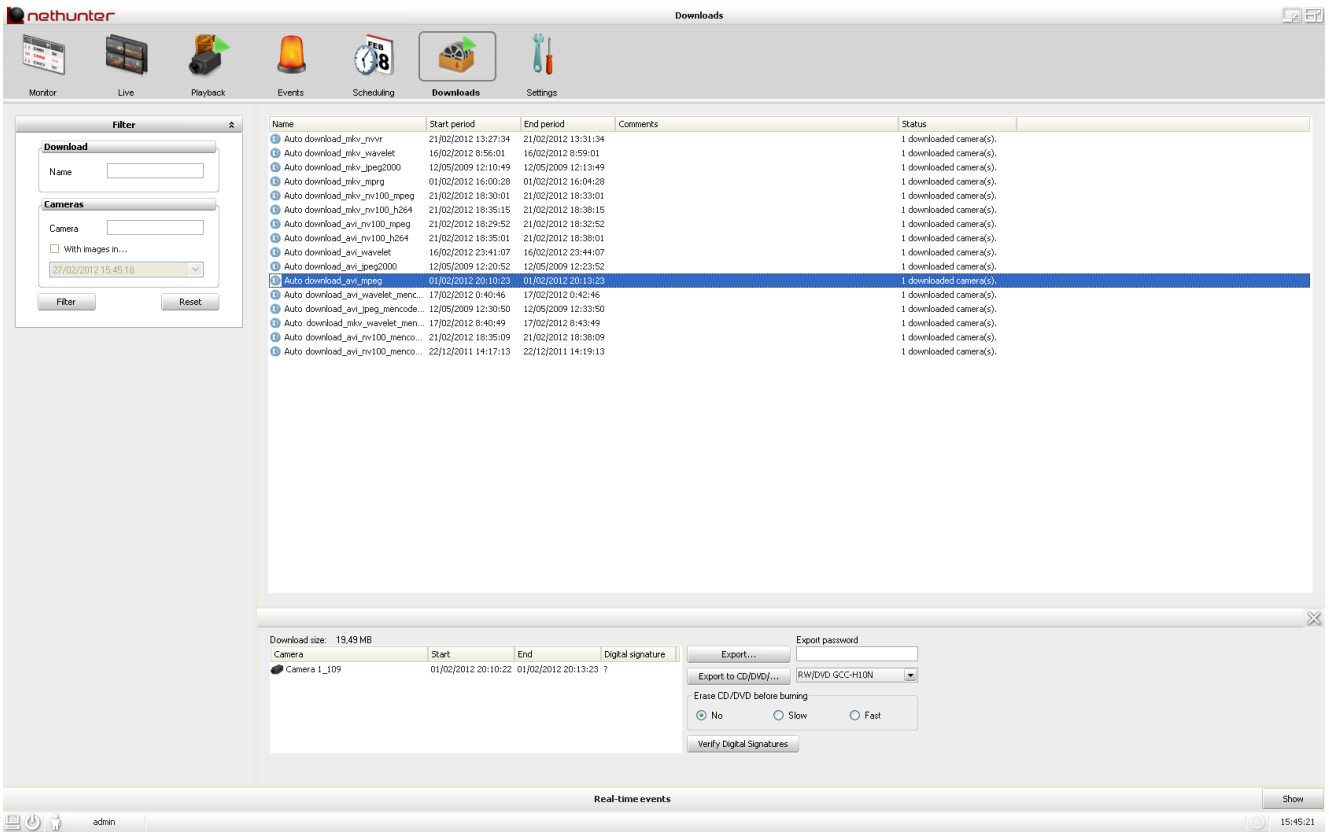

Execution Type: Multiple
Name: Multiple download test
Start date and time: 11:00:00 12/06/2012
End date and time: 11:10:00 12/06/2012
Output FPS: Auto
Native format:
Comments: Multiple download for IP cam ,exporting the day before
Save
Periodic execution
Mo Tu We Th Fr Sa Su
Days before 1 day before
Cameras
Outdoor north
Drag and drop cameras here

WARNING

- It’s not possible to watch playback images from a device that any of its cameras is being downloaded.
The Download period (start and finish) must be within the recording period otherwise will not download any video.
- Downloads with output frames per seconds below one might fail. In this case, please set one or higher or schedule a native format download.
- If the current system time is previous to the end download date/time, the download will start 5 minutes after the end download date/time.
- Once a download is scheduled, if there are downloads running it will have to wait for them to finish.

3.8 Downloads

A list of already-executed download tasks will appear on this screen.
All the download tasks will be programmed from the *Scheduling* menu option (see previous section).
The list of downloaded video appears in the working area. Each video has a brief description on the status field, showing the downloaded video content.
In a schedule with more than one camera, if any of its cameras has no video in the period, the camera won't appear in the list.
It is possible as well to see that there is "no video found" for a specific download (see example). This happens when trying to download video from a period where there's no video recorded.



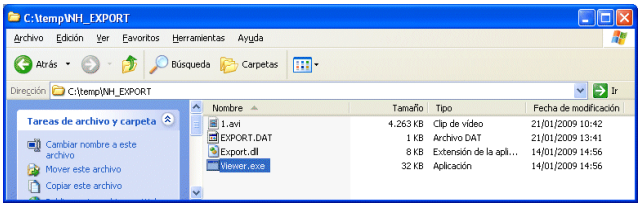
Once you select one download from the list (double click) at the bottom part of the screen you will see the download detail. The list will show all the different downloaded cameras and the start and the end date of the video. At the top of the list, you will see the total size of the download. This data is important in order to know the disk space needed.
You can also export the downloaded video to disk or any removable device through the "Export…" button. Set an export password in order to restrict hash checking.
Also you can burn a CD or DVD disk with the content of the download and erase the destination before burning it.
Double click on any camera record to watch its video. The media player used depends on the download parameters. If it's a dvr download and the option "Native format" was checked, then a specific video player for that format will be used. Otherwise, the default media player installed on that PC will be used.

3.8.1 Digital Signature

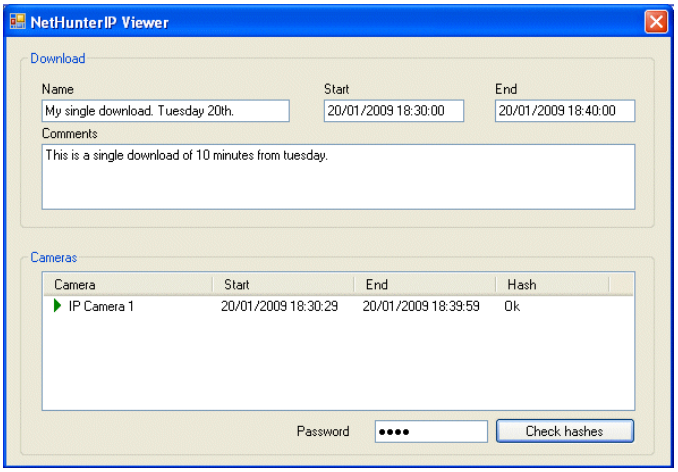
Any downloaded video content will include a security control that ensures that the exported evidence is the original one without any kind of manipulation. It is not possible to modify an exported video in any way. A Digital signature file will be used to verify this fact.
On the other hand, to increase the security of the exported video you can also protect it with a password. This password will be used to certify the video content. There is no any other way to certify that the video is correct if the operator does not know the password.

3.8.2 *Nethunter exports viewer*

Once a video is exported, a small application called “Viewer.exe” will also be recorded on the destination device.
This application will show the export name and description, the exported period, and a list of all the exported cameras with its corresponding recorded video information (date, time and camera name).


C:\temp\NH_EXPORT
Archivo Edición Ver Favoritos Herramientas Ayuda
Atrás Búsqueda Carpetas
Dirección C:\temp\NH_EXPORT
Tareas de archivo y carpeta
Cambiar nombre a este archivo
Mover este archivo
Copiar este archivo
Nombre Tamaño Tipo Fecha de modificación
1.avi 4.263 KB Clip de vídeo 21/01/2009 10:42
EXPORT.DAT 1 KB Archivo DAT 21/01/2009 13:41
Export.dll 8 KB Extensión de la apli... 14/01/2009 14:56
Viewer.exe 32 KB Aplicación 14/01/2009 14:56

On the other hand, this is the utility that will allow you to check whether the exported video was modified or not. If the video was exported with a password, type it and click on the “Check Hashes” button to validate each camera video. If it was exported without password just press the check button. Behind each camera video you will see the validation result.



To view a camera video, just click on the camera name and the media player will start playing the video.
The playback controls will depend 100% on the capabilities of your media player.

3.8.3 *Native format downloads*

This kind of downloads is only available for dvr cameras. The downloads will be saved in the raw native format of the dvr. Each dvr has a different type of format and player for watching it. Users can schedule downloads from several cameras and watch them at the same time.

NOTE

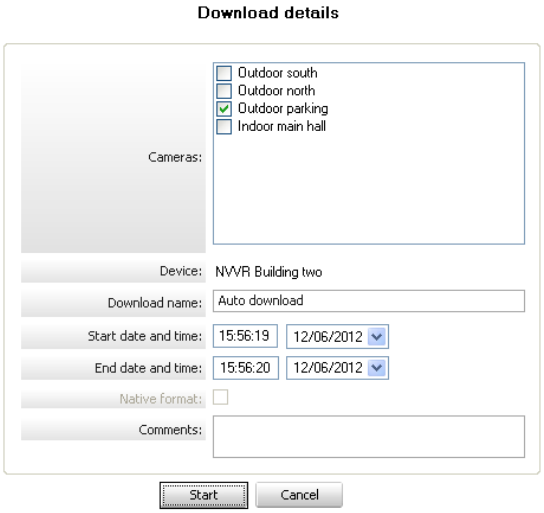
After clicking on any native format download for watching it, a preprocessing task is executed. This task might take some minutes depending on the size of it. Please, be patient. That’s why it’s recommendable to split big native format downloads into some small ones.

NOTE

If there are some cameras in the scheduled download and any of them doesn’t have recordings in that period, the download might fail. If so, schedule it again by removing that camera.

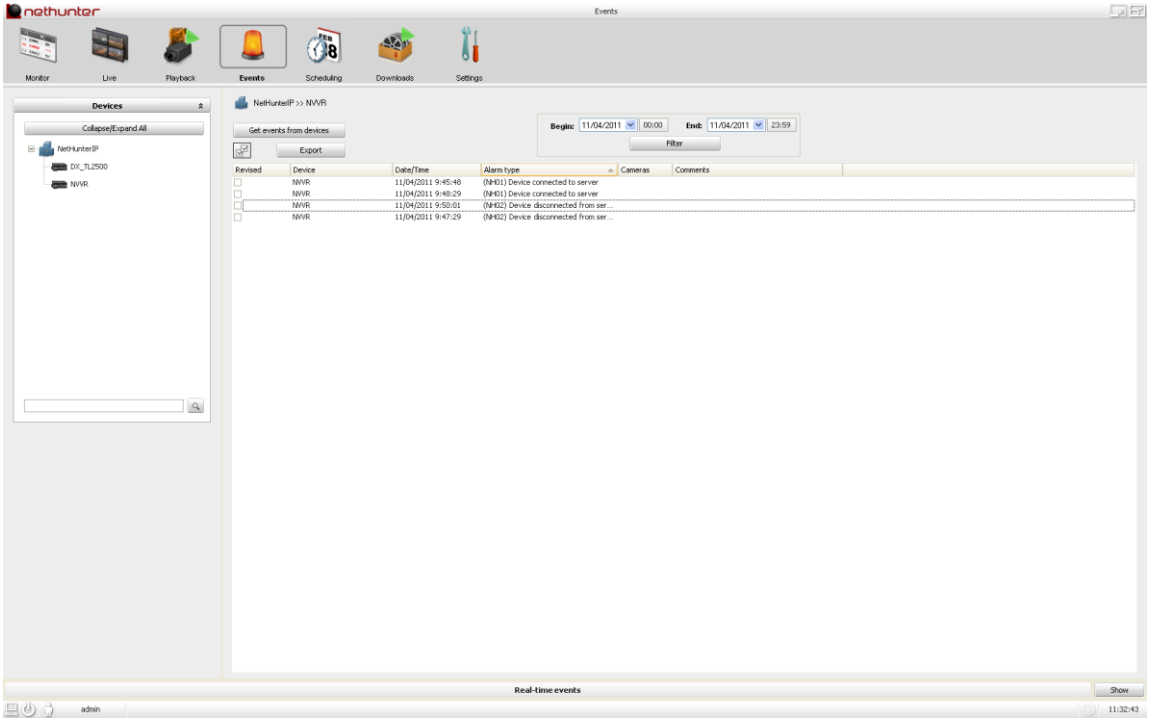
3.8.4 *Quick downloads*

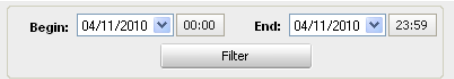
This option makes easier to schedule a download. It's launched from the context menu in Live or Playback whenever the user has rights to do it. After clicking the Start button, that download will be inserted in the Scheduling list, waiting for its turn.



3.9 Events

All the connected devices (DVR, NVR and NVVR) will generate events due several situations: alarms, connection activity, warnings, rules…
These events are gathered by the device and they are available anytime by an operator from the Events screen.





It is possible to filter events by its different parameters:

- ***Devices explorer**:* You can select just one device, all the devices on a certain tree folder or choose to view the events of the full tree structure.
- ***Dates**:* Through the top filter it is possible to choose the Start and End date of the events that you want to display on the working area.
- **Column titles**: On the other hand it is possible to order the events list just pressing a column title. A grey arrow will indicate the ordering direction. In this way it is really fast and easy to find events from a specific camera, a specific device, or an alarm type.

Checking events and description

Each event row includes a checkbox at the beginning. This is just a flag for the operator, and is used to check the already-reviewed events.

It is possible to select all the events as revised. The field "Revised by" is filled with the user that has checked the event and the field "Revised at" with the date.

Once an event has been checked as "revised", the fields "Revised by/at" cannot be emptied.

When an event has been selected, its "Event panel info" is shown.

NOTE

- By validating this checkbox, you ensure that the "Revised by" and "Revised timestamp" event data is saved together with the event.

In the comments field you can type any descriptive comment related to the event. After updating this field the event data is automatically saved.

Export

Export

Exporting data will generate a comma separated values file with “csv” extension including all the events filtered on the screen. This file could be imported into multiple applications, including Microsoft® Excel.
The exported file includes all the events information plus the related metadata.

Get events from devices

Get events

Due to the fact that the events are stored on each recorder device, first of all you have to retrieve the events on demand each time you want to check what’s happening for specific devices or the complete system.

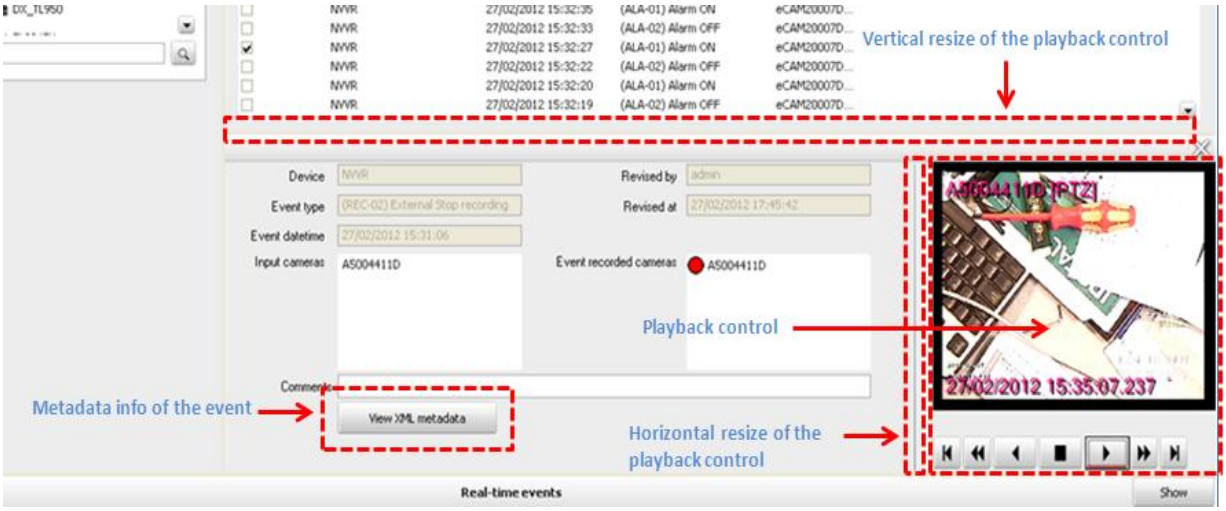
This operation will retrieve the events for the selected devices on the explorer tree filter. You can select to synchronize events from just one device, and you can choose to retrieve events from any section or the full installation, by selecting an explorer tree folder.

WARNING

This operation might take some minutes depending on the amount of selected devices. Also it will affect the devices performance during synchronization time. In certain DVR models, clients could stop receiving video while events are being requested.

When selecting one event from the events list, a panel is shown in the bottom of the screen. The new panel displays important information of the event. This panel can be resized vertically in order to increase the playback control. It can also be resized horizontally by dragging the bar on the left of it.

It’s also possible to read the metadata linked to the event (only available on NVVR events) by cliking on the corresponding button.



Only a few events allow to playback recorded video. In those cases, the camera will be listed in the “Event recorded cameras” section. These events depend on the type of device :

NVVR

- AlarmRuleON
- AlarmRuleOFF
- RecordingStartExternal
- RecordingStopExternal
- RecordingStartManual
- RecordingStopManual
- RecordingStartSchedule
- RecordingStopSchedule
- RecordingModeChangedExternal

- RecordingModeChangedManual
- RecordingModeChangedSchedule

DVR / NV100
- All events associated with a camera.

3.9.1 Context menu (right mouse button)

By clicking right mouse button on the playback split, a menu is shown with the same options as in Playback.

3.9.2 Real-time events (RT events)

Real-time events

DateTime	Device	IP address	AlarmType	Cameras	Camera IP address
27/02/2012 11:48:48	NVVR	10.227.192.28	Rule alarm OFF		
27/02/2012 11:48:48	NVVR	10.227.192.28	Recording mode changed to scheduled	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:48	NVVR	10.227.192.28	External Stop recording	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:48	NVVR	10.227.192.28	Alarm OFF	eCAM20007D8012398	10.227.192.178
27/02/2012 11:48:46	NVVR	10.227.192.28	Alarm OFF	eCAM20007D801238E	10.227.192.154

In this panel, we can see the events received by Nethunter in real-time. We obtain valuable information from each of them and we can view the camera live video from camera that caused the event.
The fields we can obtain information are:

Field	Description
DateTime	The date on which the event occurred.
Device	Device name that produced the event (NVVR, DVR…)
IP address	Device ip address that produced the event (NVVR, DVR…)
Alarm Type	Event alarm type (Camera connected, Camera disconnected, Alarm record on…).
Cameras	Camera names that caused the event. On dvrs, more than one camera might be listed. On NVVR, one as maximum.
Camera IP adress	Cameras IP that caused the event. On dvrs, no camera will be shown.

It's also possible to view the live stream from the cameras that caused the event. To do so, double-click any event from the list and then, a window with live cameras is shown. Only users with Live rights are allowed to do it.

WARNING

- When we get control of the application (in Settings - Devices), event controls list is cleaned.
- We can specify (in Settings - General) max. real-time events shown and time showing real- time events live view.
- DVRs manage real-time events and stored events in different way so they don't always match. In other words, you might see different events in Events and in the real time panel.
- On the NVVR, only cameras configured on active rules or schedules will trigger RT events.

3.10 Settings

The following menu options are available on the settings screen as a tabbed menu options.

General settings
This option has some general configuration parameters that will affect your client behavior, device parameters and aesthetic options.

Users
Nethunter users and permissions maintenance.

Splits
Administer the splits configuration and create your own splits layouts attending to your needs.

Groups/Folders
Create and manage your explorer structure that best represents your security organization tree.

Maps
Add maps to your system and populate with cameras for an easy navigation through the live screens.
Create also navigation areas between maps

Devices
Devices creation and maintenance of your Nethunter server database (DVR, NVR, NVVR, cameras…)

Remote configuration
Access remotely to the recorder devices and administer any parameter from a centralized screen.

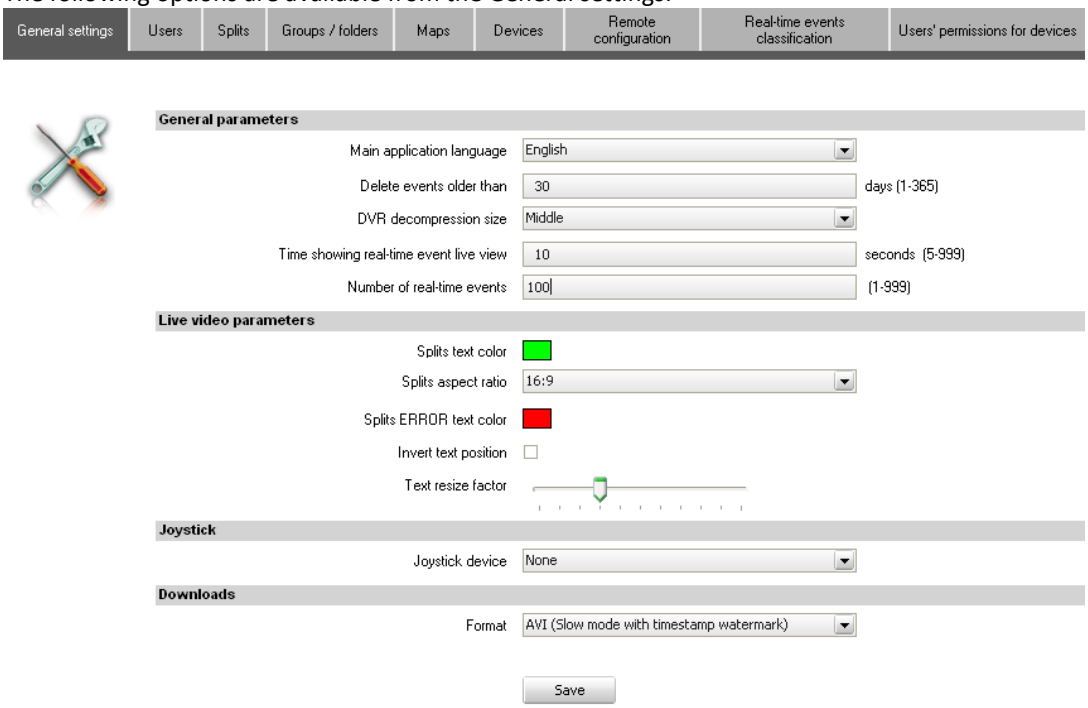
Real-time events classification
Configure what actions Nethunter client should take according to the kind of the real-time received event.

Users' permissions for devices
Grant or deny access to devices for each NH user

WARNING
After modifying any setting, all NH clients have to be restarted in order to be applied to them.

3.10.1 General

The following options are available from the General settings:



Language

Choose the language you would like to use on your Nethunter client PC.

Delete events older than

This parameter deletes those previously retrieved events, older than the specified days.

DVR decompression size

This parameter is used to tune the CPU usage on your client while decompressing JPEG2000/Wavelet DVR images. This parameter adjusts the decompression image quality, affecting only while viewing live or playback video on a client.

If you are going to display multiple cameras from different DVR together at the same client, it is strongly recommended that you reduce the decompression size to obtain better CPU performance and display better images.

(See the chapter 7.1 DVR resolutions according to the "DVR Decompression Size" for more information).

Time showing real-time events live view

This parameter is used to specify the time (in seconds) that the Live view window will show before closing it automatically. Apart from that, the live view window can be opened manually by the end-user in real-time events control by double-clicking on the event. By default the value of this parameter is 10 seconds.

Number of real-time events

This parameter is used to specify the max. real-time events number shown in the control. By default the value is 100.

Splits text color & error text color

The text color of the text information displayed on splits on normal and error situations.

Splits aspect ratio

There are two possible aspect ratios for the splits : 4:3 and 16:9. This aspect ratios don't affect the aspect ratio of the video shown inside of the splits. In order to change the aspect ratio of the video images, change the parameter "Original aspect ratio". Read more info about this parameter on the Live context menu options.

Invert text position

When this check is selected, camera name will be displayed in the opposite side of the splits and other extra information will be shown in the upper side.

Text resize factor
Users can adjust text size by means of it. The more on the right side, the bigger the text will be shown.

Joystick device
Users can select between two Joystick devices:

- CH products IP Desktop USB joystick: Driver to maximize the CH Joysticks functionality.
- Generic USB Joystick: Generic driver to use with any USB Joystick device using DirectInput.

Download format
There are two available download formats:

- **AVI**: This method exports the video to a file with .avi extension. With this method, the video timestamp is rendered in the video as a watermark. It's the slowest method.
- **MKV**: This method exports the video to a file with .mkv extension. With this method, the video timestamp is inserted in the .mkv container as a subtitles track. It must be played with a player capable of mkv with subtitles playing. It's the fastest method.

In both methods the codec used is:

- **MPEG-4**: If the device codec is MPEG-4, JPEG2000 or Wavelet, the resulting exported file will be encoded as MPEG-4 standard.
- **H.264**: If the device codec is H.264, the resulting exported file will be encoded as H.264 standard.

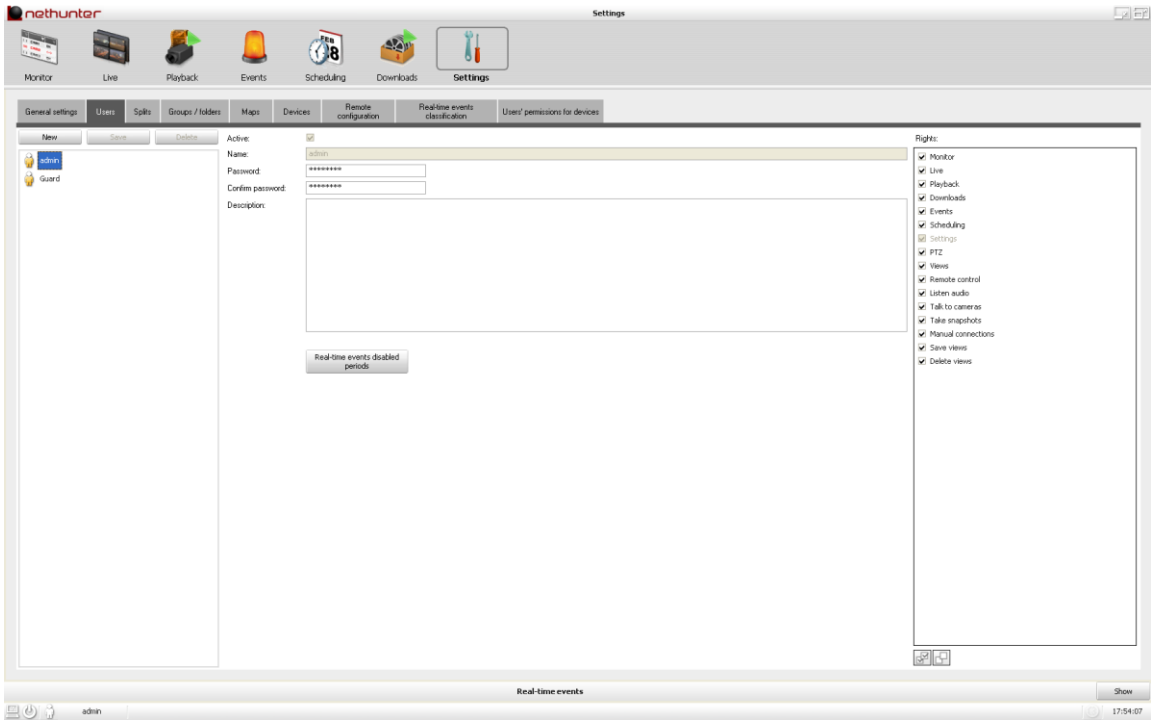
WARNING

All General settings are specific for each user, excepting for the setting " Delete events older than" which is applied to all users from the value set for the user "admin".

3.10.2 Users

It is possible to create as many users as needed in the system. Depending on your needs it is possible to use one or more user profiles protected by password.
Create new users and assign different permissions by choosing the most appropriate ones on the right panel "Rights".
The first seven permissions are related to its corresponding option in the top menu options.
The "PTZ" permission enables or disables to be able or not to move PTZ cameras. A user without this permission will not be able to move any PTZ camera.
The "View" permission enables or disables the Views panel In Live. A user without this permission will not be able to choose or add new views.
The "Remote control" permission enables or disables the option "Remote control" in the pop-up menu in Monitor. A user without this permission will not be able to perform remote commands on any device.
The "Listen audio" permission enables or disables the option "Listen audio" in the pop-up menu on the splits. A user without this permission will not be able to listen audio from any camera.
The "Talk to cameras" permission enables or disables the option "Talk to camera" in the pop-up menu on the splits. A user without this permission will not be able to transmit audio to any camera.
The "Take snapshots" permission enables or disables the options "Export image" and "Print image" in the pop-up menu on the splits. A user without this permission will not be able to export or print any snapshot from any camera.

The “Manual connections” permission enables or disables the options “Restart IP camera”, “Connect DVR”, “Disconnect DVR”, “Connect all DVRs” and “Disconnect all DVRs” in the pop-up menu in Monitor. A user without this permission will not be able to perform all these actions.
The “Save views” permission enables or disables to save/modify views in Live.
The “Delete views” permission enables or disables to delete views in Live.

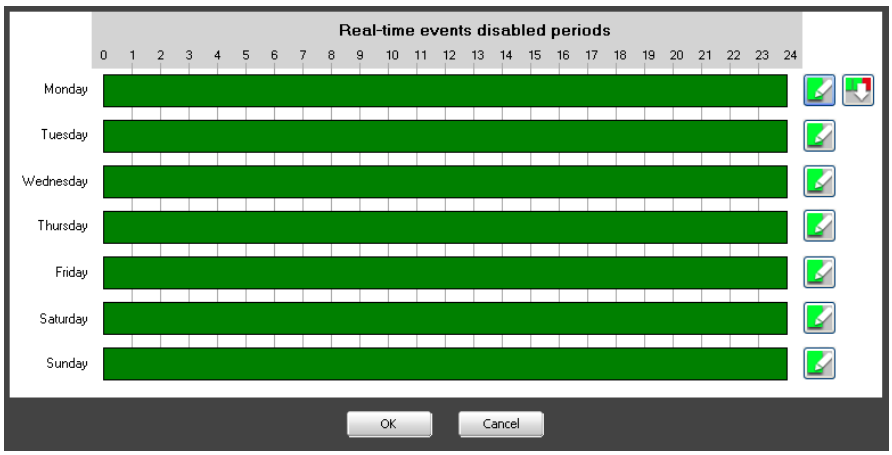


There are no limitations on the amount of users or permissions combination.
Each user will be able to login to Nethunter from any client PC.

WARNING
“Admin” user is not allowed to be removed as it is necessary for administration tasks. In order to enforce security, it’s recommended to deny rights to “Settings” to all users excepting for “admin”.

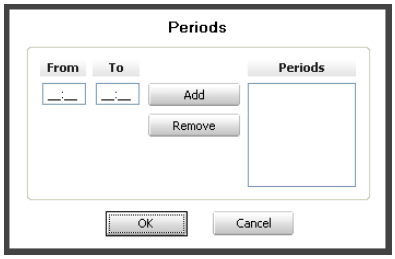
3.10.2.1 Real-time events disabled periods

Administrators can configure in what periods real-time events are disabled for each user.
The button “Real-time events disabled periods” is enabled only if the user was already created. After clicking on it, the following screen is shown.



For each day of the week, it's possible to set in what periods the real-time events will be received. There are two possible actions :

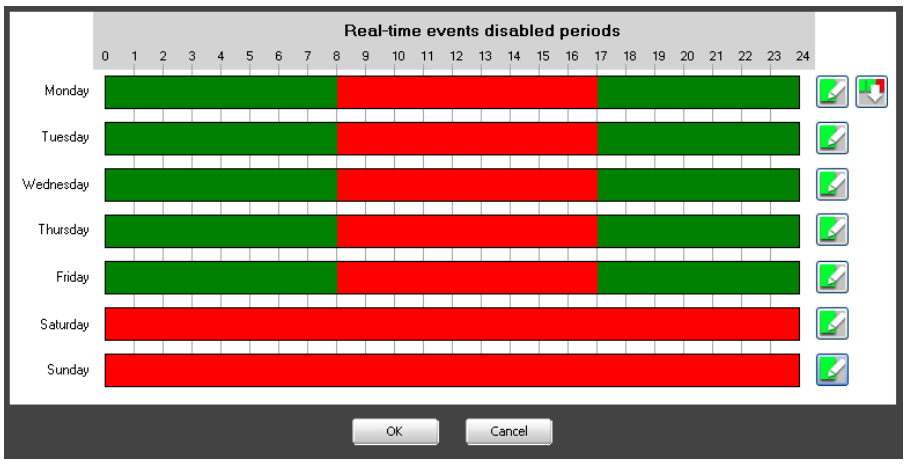
Edit the periods for that day. When clicked, the following window is shown :



The field "From" is the start time of the period. The format is hh:mm. Once the focus was set on it, the field must be filled. The seconds are set to 0 and can't be changed.
The field "To" is the end time of the period. The format is hh:mm. Once the focus was set on it, the field must be filled. The seconds are set to 59 and can't be changed.
When both fields are filled, the button "Add" will add the period to the list on the right. If any period is not needed, it can be removed by selecting it and clicking on the button "Remove".

Replicate the Monday periods on the other days of the week

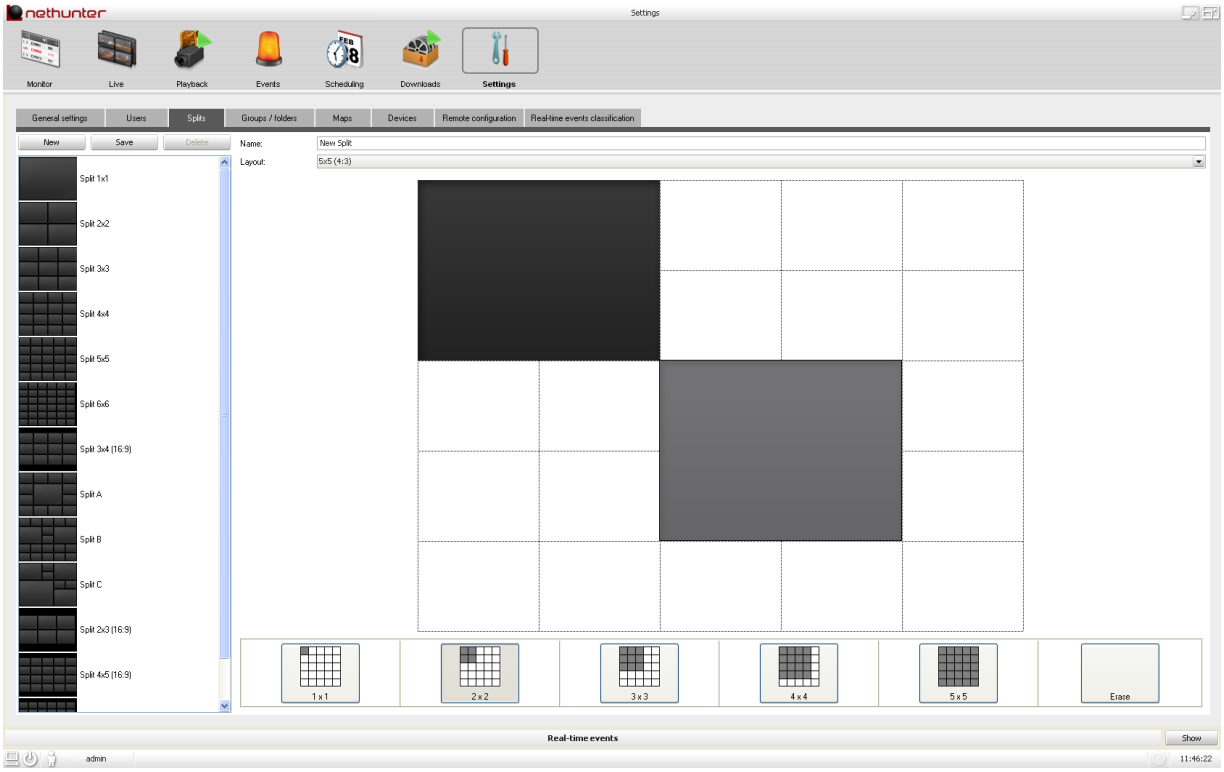
In the example below, the selected user will not be able to receive real-time events from 8h to 17h on weekdays and from 0h to 23:59h on weekends.



WARNING
After confirming the disabled periods in the “Real-time events disabled periods” form, you have to click on the “Save” button in the Users settings to record the changes.

3.10.3 Splits

Nethunter comes with a complete set of split layouts available to use in live or playback screens, but it is also possible to modify the existing ones or create new ones depending on operator needs.

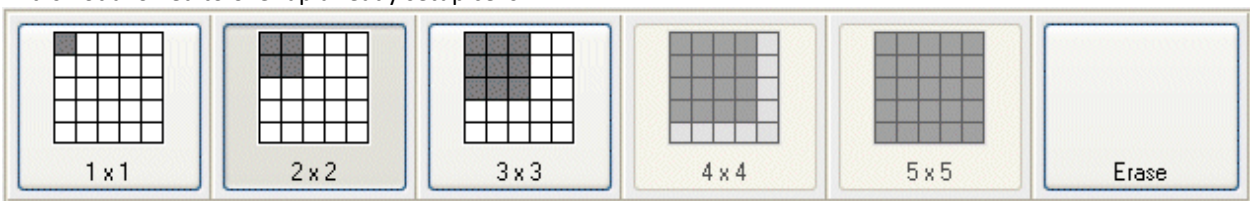


The right panel is a splits editor where you “drag & drop” split cells of different sizes.

To create a new split , click on “New” ,provide a name and choose one of the existing layouts.
The aspect ratios currently available are: 4:3 and 16:9 with the following combinations:

4:3 aspect ratio: 3x3, 4x4, 5x5, 6x6 cells matrix
16:9 aspect ratio: 2x3, 3x4, 4x5, 5x6 cells matrix

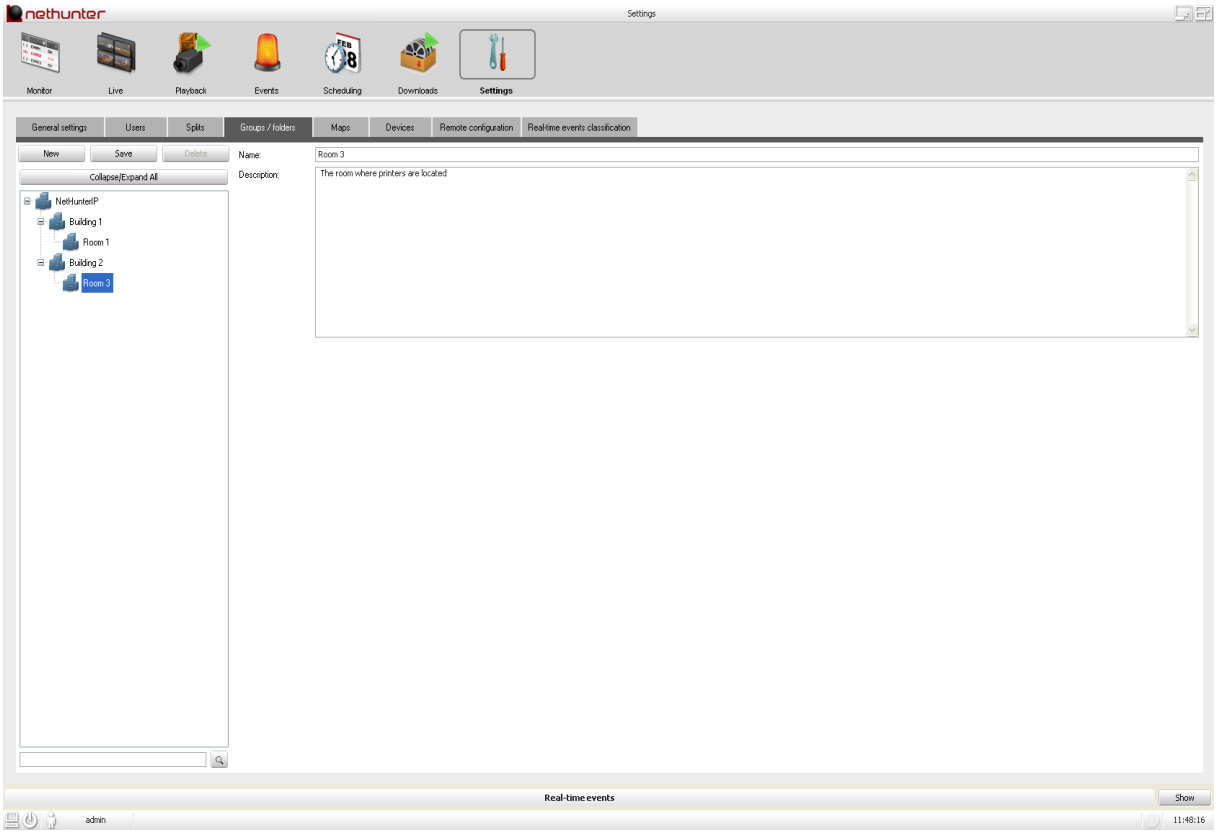
At this point, it is possible to define the cells content through the controls below. Just click on a split cell size and fill the blank matrix with the combinations that you want.
Over the matrix, in blue color is selected the combination that will be applied when you “click” with your mouse. It is not allowed to overlap already setup cells.



The splits configuration is applied at Server level. All the connected clients will have the same splits combinations available.

3.10.4 Explorer tree (groups/folders)

Nethunter offers a navigation component that will be visible on the main screens.
This component is configured through the “Groups/folders” option and also is visible as an “explorer” on Nethunter screens



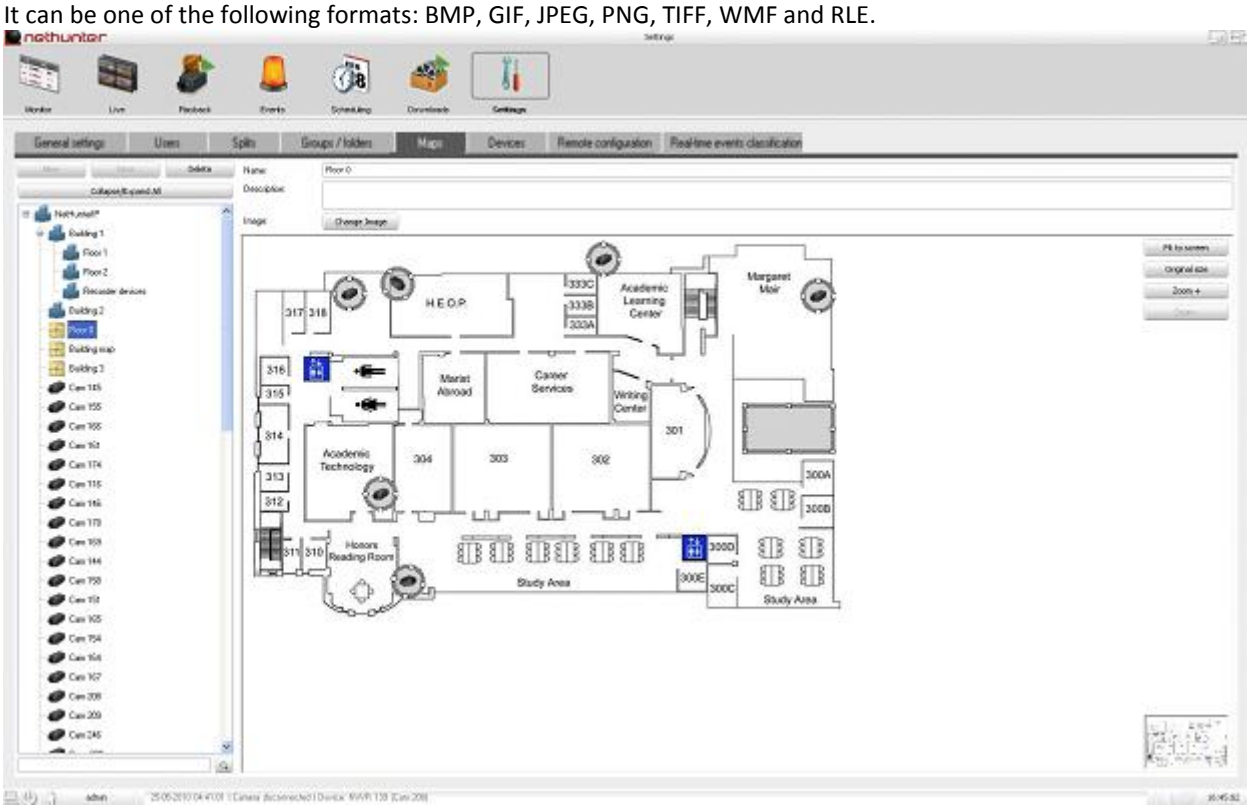
After Nethunter installation, only one node will be visible on this structure: “NethunterIP”.
You can change the name and description of any node on the tree by selecting it and pressing “Save” button after changes.

To create a new tree node press the “New” button. It will be created under the selected node of the tree. After creating it, it is possible to move nodes by a simple “drag & drop” operation.

3.10.5 Maps

The maps configuration option gives the operator all the flexibility to navigate between maps in any direction, including recursive flows. This option allows adding cameras into a map with a simple “drag & drop” operation. It is also possible to change the camera icon orientation to adjust the picture to actual installation layout.
It is possible to create maps at any browser level. Just select one browser level and press the “New” button.

In fact, a map is an image file that you can choose through a standard Windows® explorer browser by clicking the “Change image” button.
It can be one of the following formats: BMP, GIF, JPEG, PNG, TIFF, WMF and RLE.



Adding cameras
The maps and the cameras are visible in the browser control. Just “drag & drop” a camera into the map and put it into its correct position.
To rotate the camera icon, click on a camera border (white circle) and move it on the appropriate direction.

Adding map navigation zones
It is possible to “drag & drop” a map into another map. This will create a navigation area (map link).
During operation, if an operator clicks that area, the source map will be changed by the referenced map. It is possible to create “loops” between maps in order to implement a logical “back” operation.
On the example above the “exit” region is linked to another map. You can “drag & drop” and resize it as convenient.

Removing maps components
To remove any map component (camera or map links), just right-click on that component and then press “Delete camera” or “Delete link” option.

3.10.6 Devices

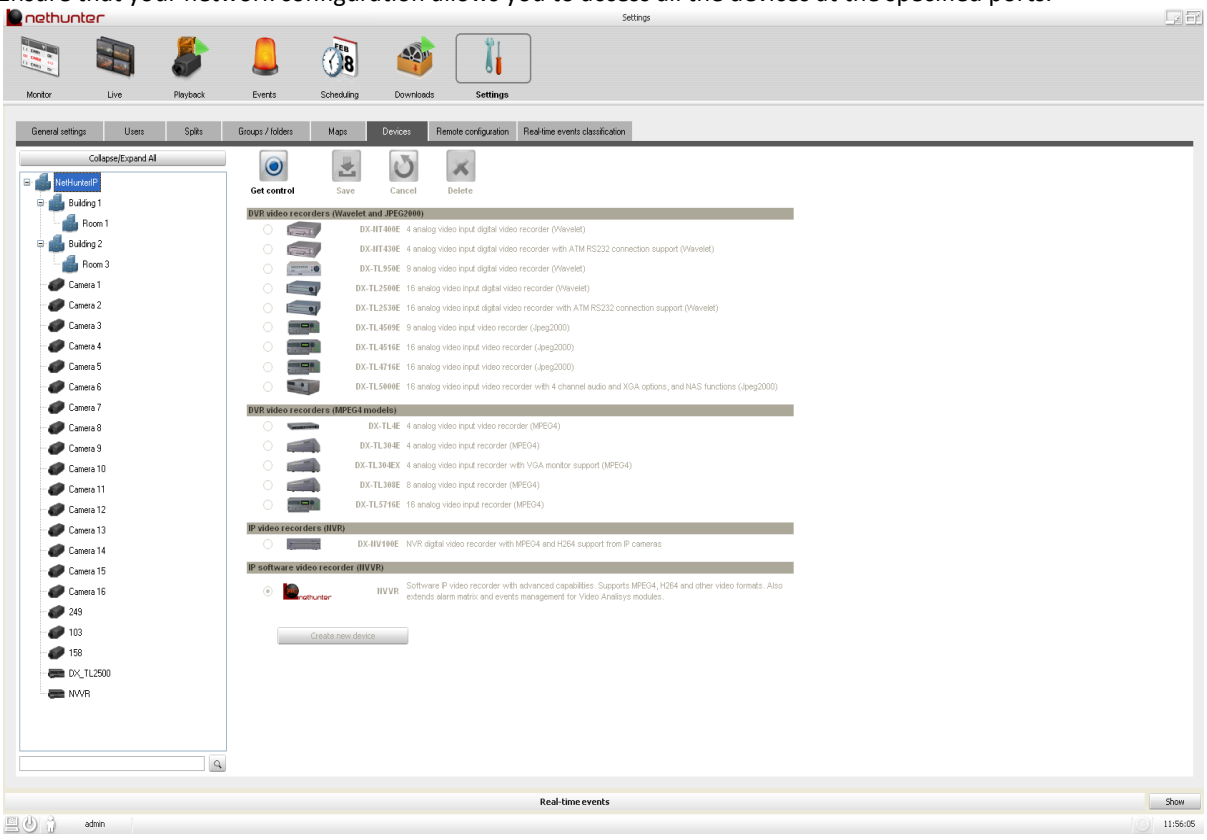
This section is aimed to add and remove devices, and change local device settings. These settings are stored on the NHServer database and are used by NHServer to manage the devices. On the other hand, the settings shown in Remote configuration (see the next section) are stored on each device and are used by each device for internal purposes.

3.10.6.1 Getting and releasing control

Nethunter architecture allows multiple clients connections to a common server. All configured devices are stored and managed by this common server shared between all the different clients.
In order to avoid possible system inconsistence due to devices modification, it's necessary to get the full control of the system by pressing the "Get control" button.
This action will disable any client operation until the control is "released" again. Currently-connected clients will be notified of the administration "lock".
After releasing the control, all the clients will be able to work as usual.

3.10.6.2 Adding new devices

Choose a device location on the explorer tree and press the "New" button. A list of available devices will appear. Select the desired device and press the "Create new device" button. Fill all the required fields (IP Address, name, camera names, etc.).
It's necessary that the device is connectable at the moment of adding it. Otherwise it won't be possible to add it. Ensure that your network configuration allows you to access all the devices at the specified ports.



After a device is set up, you can change or configure its internal parameters and device options through the Remote Configuration option tab. To know each device parameters, please check its user or setup guide.

For Nethunter NVVR (IP recorder) configuration, please check at the next chapter.
There is a complete dedicated chapter that describes all the creation process and parameters.

3.10.6.2.1 DVR

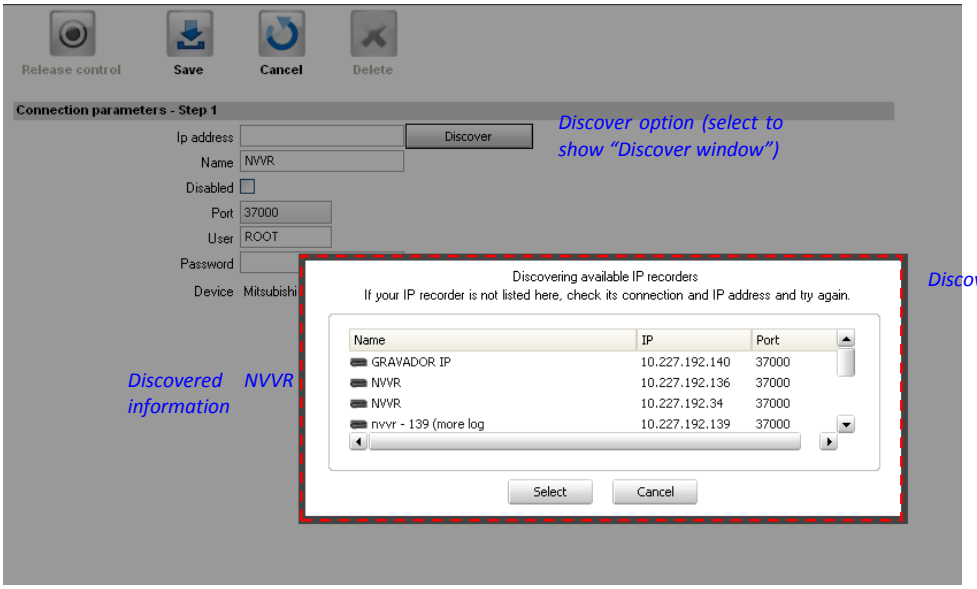
Some of the configuration parameters may differ between DVR models. Please, check the DVR users guide to clarify any parameter question or functionality behavior.

	Field	Description
STEP1	IP address	Neither type the new device IP address without spaces nor left side zeros. (correct: 192.168.0.10, incorrect: 192.168.000.010)
	Name	Camera descriptive name (up to 50 characters maximum)
	Disabled	Check this option to disable the camera temporarily.
	Port	Type your DVR port. By default it is 53705 for all Mitsubishi DVRs.
	User	DVR administrator username. Do not change this parameter unless your distributor tells you to do so.
	Password	DVR administrator password. Do not change this parameter unless your distributor tells you to do so.
STEP2	Check status interval	Seconds between status checks (from one to 99 seconds). By default three.
	Live quality	DVR output image quality for Live operations (Super, High, Standard, Basic, Low). Depending on the DVR quality, the decompression operations will require more CPU usage on the client side. DVR output bandwidth is not affected. Not available for MPEG-4 models.
	Play quality	DVR output image quality for Play operations (Super, High, Standard, Basic, Low). Depending on the DVR quality, the decompression operations will require more CPU usage on the client side. DVR output bandwidth is not affected. Not available for MPEG-4 models.
	Cameras	List of available DVR cameras. Depends on DVR model. All the DVR cameras are automatically named with a sequential number. Change them to match them with your needs.
	Icon	It is possible to change each camera icon. This icon will be displayed in the explorer and another Nethunter controls.
	PTZ	Check this box only for analog PTZ cameras. This option will enable the PTZ control in the live view and in the Monitor screen. Hint: do not use this option for non-PTZ cameras to minimize system resources (DVR ports, memory…)

3.10.6.2.2 Nethunter Recorder (NVVR) + IP Cameras

Users can discover NVVRs on the network or fill in the connection data manually.

By pressing the button “Discover”, the system automatically discovers the available NVVR devices in the network. In the following screen there’s an example with some NVVRs found in the same network.
In order to add a NVVR, click on it and then press “Select”.

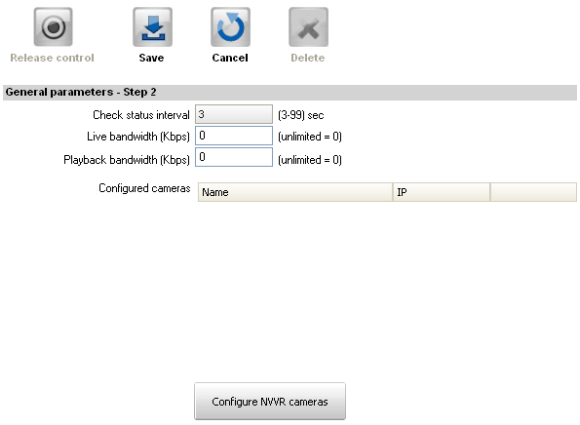


Alternatively, users can fill the NVVR connection data manually.

Users have to fill in all the device parameters. It is divided into two steps. In the first one, the following parameters have to be filled in.

Field	Description
IP address	Neither type the new NVVR IP address without spaces nor left side zeros. (correct: 192.168.0.10, incorrect: 192.168.000.010)
Name	Name of the NVVR
Disabled	Check this option to disable the NVVR and all cameras IP temporarily.
Port	Type your NVVR port. By default it is 37000 for all NVVR. Do not change this parameter unless your distributor tells you to do so.
User	NVVR administrator username. Do not change this parameter unless your distributor tells you to do so.
Password	NVVR administrator password. Do not change this parameter unless your distributor tells you to do so.

The second step is started when users click on the button “Next” on the first step. The following screen is shown.



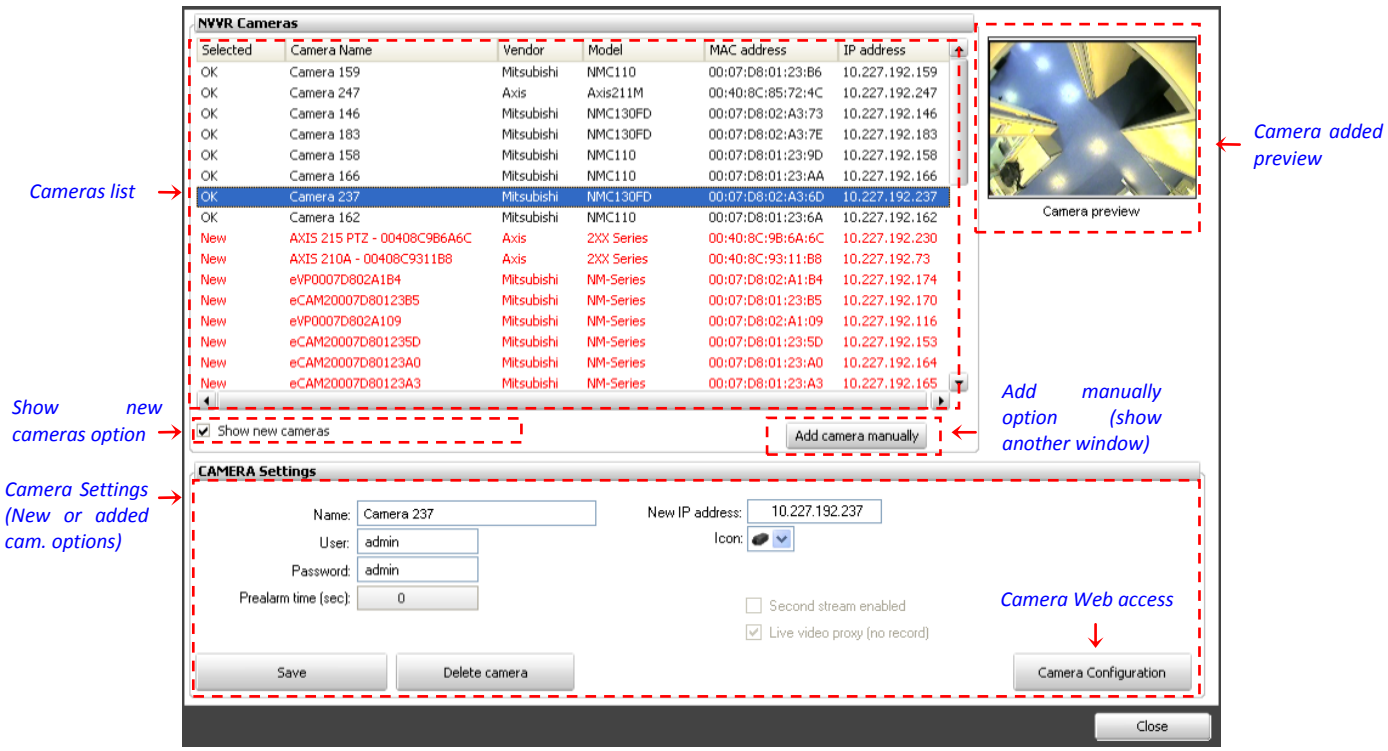
The following parameters have to be filled in.

Field	Description
Check status interval	Select the time interval between status check (3-99 sec.). By default 3.
Live Bandwidth (kbps)	Maximum output live bandwidth allowed between the NVVR and the NHServer. This value can be configured for each NHServer connected to the NVVR. By default 0 (unlimited).
Playback Bandwidth (Kbps)	Maximum output playback bandwidth allowed between the NVVR and the NHServer. This value can be configured for each NHServer connected to the NVVR. This setting also applies to downloads. By default 0 (unlimited).
Configured Cameras	List with cameras configured in the NVVR.
Option “Configure NVVR cameras”	A window where users can manage the IP cameras recording on that NVVR is shown

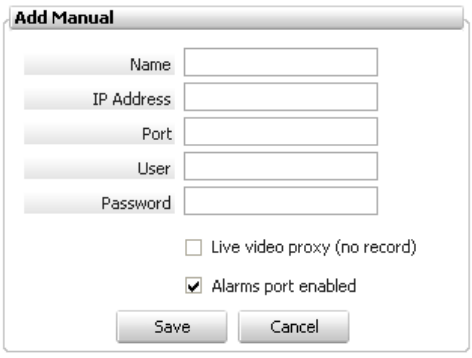
In order to add/remove/configure the cameras of the NVVR, click on the button “Configure NVVR cameras”.

The following screenshot shows the window where all IP cameras are managed. The available functionalities are:

- IP cameras auto-discovery.
- IP cameras manual addition.
- IP cameras deletion.
- Modify IP cameras settings (Name, User, Password, Icon, etc.).
- Change IP camera IP Address.
- Change IP camera internal settings (Codec, network parameters, etc.) using its web access.


NVVR Cameras
Selected
Camera Name
Vendor
Model
MAC address
IP address
OK Camera 159 Mitsubishi NMC110 00:07:D8:01:23:B6 10.227.192.159
OK Camera 247 Axis Axis211M 00:40:8C:85:72:4C 10.227.192.247
OK Camera 146 Mitsubishi NMC130FD 00:07:D8:02:A3:73 10.227.192.146
OK Camera 183 Mitsubishi NMC130FD 00:07:D8:02:A3:7E 10.227.192.183
OK Camera 158 Mitsubishi NMC110 00:07:D8:01:23:9D 10.227.192.158
OK Camera 166 Mitsubishi NMC110 00:07:D8:01:23:AA 10.227.192.166
OK Camera 237 Mitsubishi NMC130FD 00:07:D8:02:A3:6D 10.227.192.237
OK Camera 162 Mitsubishi NMC110 00:07:D8:01:23:6A 10.227.192.162
New AXIS 215 PTZ - 00408C9B6A6C Axis 2XX Series 00:40:8C:9B:6A:6C 10.227.192.230
New AXIS 210A - 00408C9311B8 Axis 2XX Series 00:40:8C:93:11:B8 10.227.192.73
New eVP0007D802A1B4 Mitsubishi NM-Series 00:07:D8:02:A1:B4 10.227.192.174
New eCAM20007D80123B5 Mitsubishi NM-Series 00:07:D8:01:23:B5 10.227.192.170
New eVP0007D802A109 Mitsubishi NM-Series 00:07:D8:02:A1:09 10.227.192.116
New eCAM20007D801235D Mitsubishi NM-Series 00:07:D8:01:23:5D 10.227.192.153
New eCAM20007D80123A0 Mitsubishi NM-Series 00:07:D8:01:23:A0 10.227.192.164
New eCAM20007D80123A3 Mitsubishi NM-Series 00:07:D8:01:23:A3 10.227.192.165
Camera preview
Cameras list
Camera added preview
Show new cameras option
Show new cameras
Add camera manually
Add manually option (show another window)
Camera Settings (New or added cam. options)
CAMERA Settings
Name: Camera 237
User: admin
Password: admin
Prealarm time (sec): 0
New IP address: 10.227.192.237
Icon:
Second stream enabled
Live video proxy (no record)
Camera Web access
Save
Delete camera
Camera Configuration
Close

Options	Description
Show new cameras	Checking this option, makes the system auto-discover all the IP cameras and IP encoders connected to the network.
Add camera manually	This option is used to add an IP camera manually. (see screen below)
NVVR Cameras	The IP Camera list. The added cameras are represented in black and new found cameras in red.
Camera Settings	Type the camera name, user, password, etc. Read below some warnings about some fields.
Replace camera	The “Replace” flow is explained below



WARNING

Live video proxy must be enabled for IP cameras recorded with the NV100E device so all the cameras added with this checkbox enabled will not be recorded with a NVVR. Moreover, no licenses are needed for these cameras.

If this checkbox is not enabled, the recording task is undertaken by the NVVR and one license per camera is needed.

WARNING

If the IP address is changed at the same time that the camera is added to the system, the process may fail.
In that case, Nethunter will prompt a message and the “Show new cameras” option must be executed again and the IP camera added again. This time it will have the IP already changed.
When a new camera is added, if the ip address is changed,a “ping” network command is performed to the new ip address for checking the status. If the ip camera does not reply , the NVVR will not add it.
Likewise, if the ip address of any camera on the NVVR is changed, a “ping” network command is performed to the new ip address for checking the status. If the ip camera does not reply, the changed is not accomplished.

NOTE

MJPEG codec is not supported by Nethunter system. Please, set all the cameras codec to either MPEG-4 or H.264.

NOTE

The first stream is used by the NVVR to broadcast Live images. The secondary stream is used by the NVVR to record images.

NOTE

From version v2.5 on, the NVVR is recording a fixed to 10 seconds post-alarm. It is not configurable.

WARNING

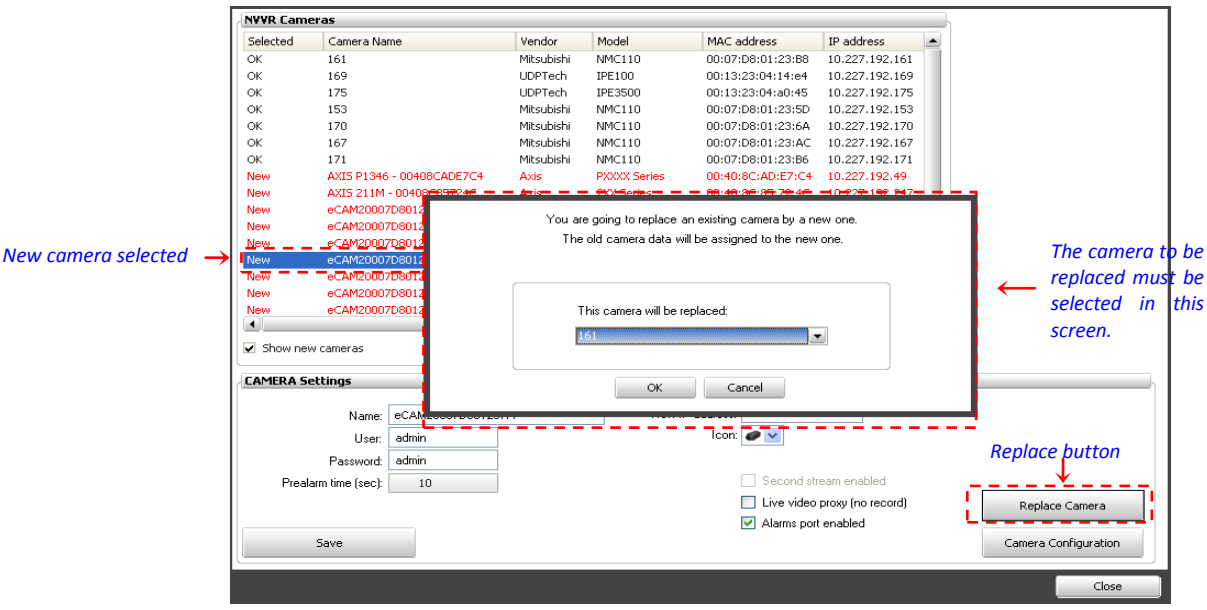
If the setting “Second stream enabled” is checked, the camera or the NVVR have to be restarted in order to take effect.
This functionality is only supported by UDPTech cameras and Axis cameras with firmware v5.
The cameras configured as dual-streaming are shown as “Connected” in Monitor only when both streams are connected properly.
On Axis cameras, the secondary stream is the profile named as "Quality". If this profile is not present on the camera, admins must create it. Otherwise the connection to the secondary stream will fail.

WARNING

Only when the setting “Alarm ports enabled” is checked, the NVVR will get the events from that camera. It’s recommended to leave this setting checked. In addition, check that the alarms port is enabled on the camera.

Replace camera option

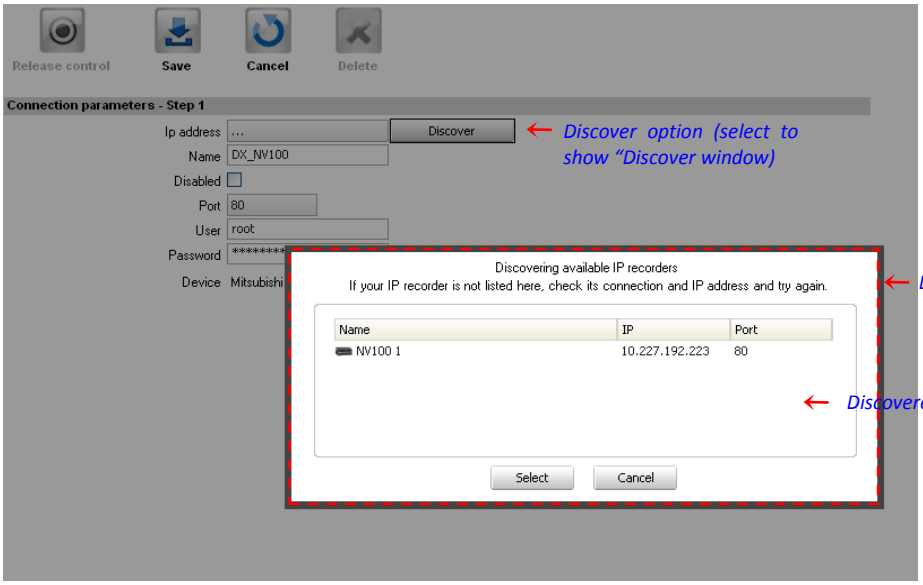
We can replace new found cameras by cameras that are already added to the NVVR device easily. This action is usually performed when a camera stops working and we want to replace it but keeping all its recordings and configuration. When a camera replaces another one, the old recordings, scheduling and all the settings related to the replaced camera are assigned to the new one.
An example of this process is shown in the screenshot below.



3.10.6.2.3 NV100E

Users can discover NVVRs on the network or fill in the connection data manually.

By pressing the button “Discover”, the system automatically discovers the available NV100E devices in the network. In the following screen there’s an example with one NV100E found in the same network.
In order to add the found NV100E, click on it and then press “Select”.



Alternatively, users can fill the NV100 connection data manually.

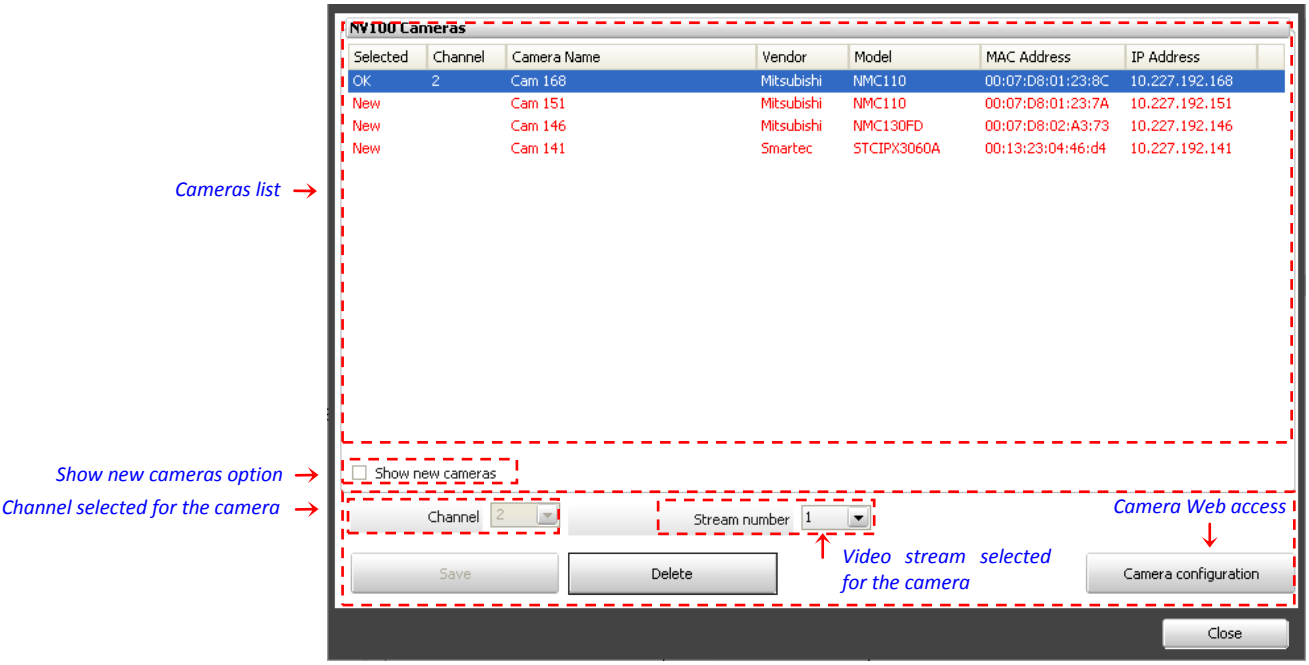
the fields to fill when we creating a NV100E device are shown in the table below :

	Field	Description
STEP 1	IP address	Neither type the new NV100E IP address without spaces nor left side zeros. (correct: 192.168.0.10, incorrect: 192.168.000.010)
	Name	Name of the NV100E
	Disabled	Check this option to disable the NV100E.
	Port	Type your NV100E port. By default it is 80 for all NV100E. Do not change this parameter unless your distributor tells you to do so.
	User	NV100E administrator username. Do not change this parameter unless your distributor tells you to do so.
	Password	NV100E administrator password. Do not change this parameter unless your distributor tells you to do so.
STEP 2	Check status interval	Select the time interval between status check (6-99 sec.). By default 6.
	Configured Cameras	List with cameras configured in the NV100E.
	Option "Configure NV100 cameras"	A window where users can manage the IP cameras recording on that NV100 is shown

In order to add/remove/configure the cameras of the NVVR, click on the button "Configure NVVR cameras".

The available functionalities are:

- IP cameras with live proxy enabled auto-discovery.
- Unassign IP cameras already assigned to this NV100E.
- Change IP camera internal settings (Codec, network parameters, etc.) using its web access.



Options	Description
Show new cameras	This option is used to auto-discover all the IP cameras added to NVVR with the Live video proxy checkbox enabled.
Channel	This option is used to select the channel that will record the camera on the NV100 (between one and 16)
Stream number	This option is used to select the video stream from the camera that you want to record (only available in UDPTech, Smartec and AXIS cameras).

WARNING

- Stream number selected must be configured in the camera web server.

- If there's any network connection problem during the retrieval of cameras from NV100E, there won't appear any camera in the list.

- Hitron cameras must have "Enable anonymous viewer login" checked and a valid default router for working fine on a NV100.

- If you would like to change the recording device of any camera ,from the NV100 to the NVVR,you must delete the camera from the NV100 and from the NVVR and add it again on the NVVR as not "Live Only".

- If you need to change any settings from a camera which is recording on a NV100, you must delete the camera from the NV100, change the settings and add it again to the NV100.

3.10.7 Remote configuration

Managing devices remotely from a client helps to configure any device with a centralized interface and a unique PC.
Nethunter architecture does not allow the clients to have any direct interaction with final devices. Remote configuration allows you to load and save each device settings from any client with few simple steps.
Each device will display different parameters on this section. Please, refer to each device manual to understand all its available parameters.

When a device is selected there are some available options (buttons) to manage its settings resources:

Button	Description
Load from device	Get the device configuration parameters. This option must be done before checking or administering device parameters. Otherwise the device parameters will be in a disabled status.
Save to device	After administering parameters you need to send them to the device in order to be applied.
Export to file	Trough this option it is possible to backup a device parameters list. It is required to "Load from device" first. (Not available in NVVR)
Import from file	Option to restore settings that are recorded through the "Save to file" option. (Not available in NVVR)

After saving the configuration to a specific device, it will be applied.
Some devices may have different behaviors after applying new settings (no effect, restart, …) it is recommended to check the specific device documentation to be sure that it will not have any unexpected result.

3.10.8 Real-time events classification

This option allows end-users to configure what actions will be executed by Nethunter clients according to the real-time received event. This configuration is stored on the NHServer database and applies to all NHClients which are connected to the same NHServer.
It's up to end-users configure it according to its internal policy. By default, all devices are configured in the category "Information" and that category have only checked the action "Notify in real-time panel".
There are 2 different sections to complete all configuration.

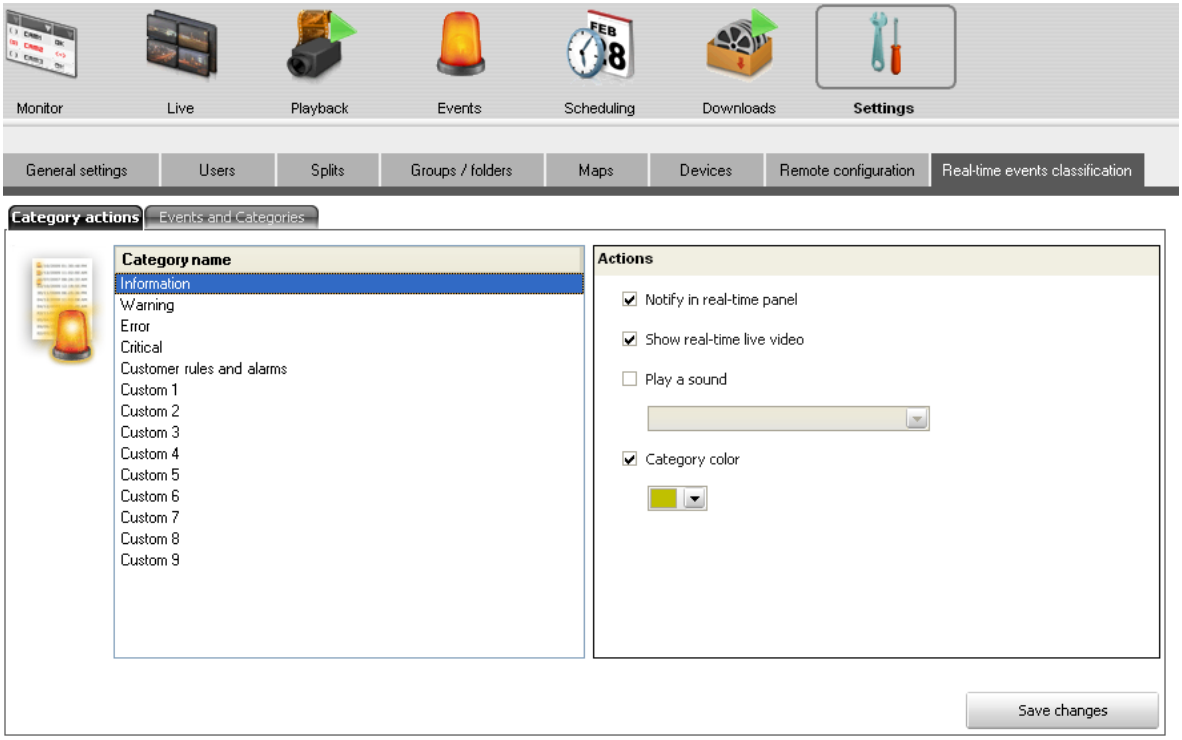
WARNING
Keep in mind that a wrong configuration might collapse Nethunter clients. For example, by showing Live popup video when a very often event is received. If this is the case, keep pressed the Shift key to avoid that any Live popup window to be shown and change the configuration.

3.10.8.1 Category actions

In this option, the categories are linked to the available actions. Whatever change made must be confirmed by clicking on the button "Save changes". There are 4 different actions :

- Notify in real-time panel : The event is shown in the bottom RT events panel.
- Show real-time live video : Live video from the cameras linked to the event is shown in a pop-up window in the primary monitor.
- Play a sound : The sound selected in the list is played. All .wav files stored in the folder "Sounds" will be shown in that list.
- Category color : The color of the event when shown in the bottom RT events panel.

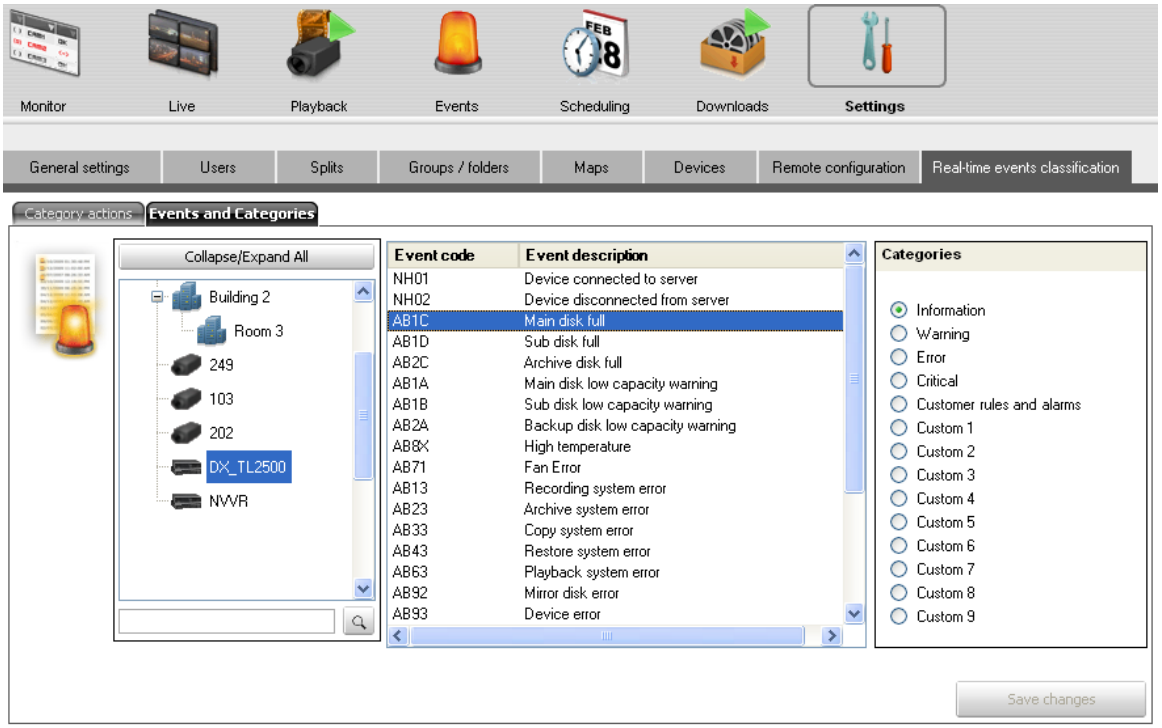
For example, in the following screenshot the "Information" category has 3 active actions : notify in real-time panel , show real-time live video and the category color. When any event of category "Information" arrives, the event will be shown in the bottom RT events panel in olive color and a pop-up window showing live images from the event cameras will be shown.
In order to complete the configuration, the link between events and categories must be done. This is set in the tab "Events and categories"



3.10.8.2 Events and categories

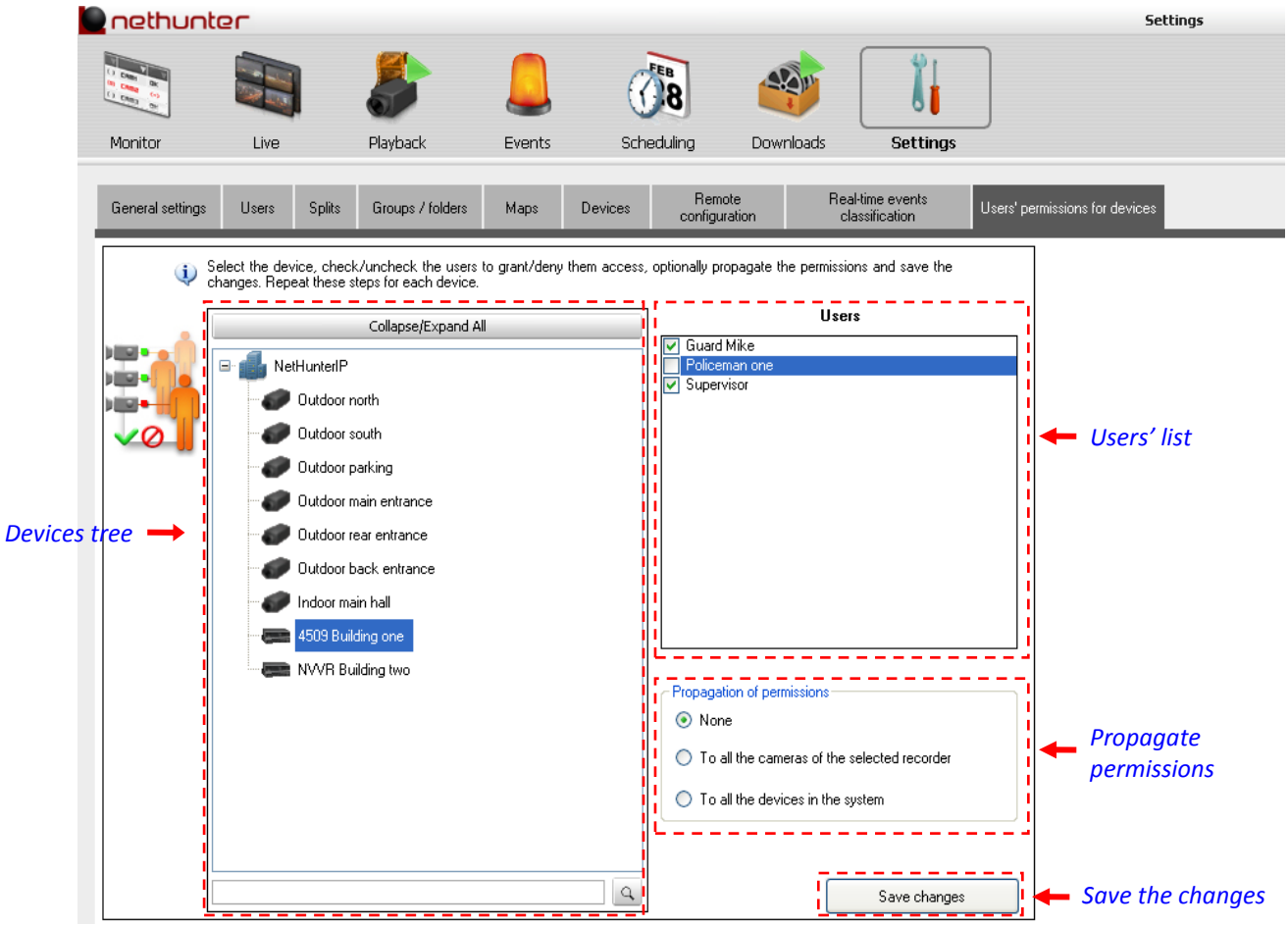
In this tab, end-users set the category for every event of each device. After clicking on any device, its available events will be shown in the list. After clicking on the event, the category is allowed to be clicked. When changed the category, the button “Save changes” will become available.
Multiselection is possible in the event list so it’s easy to apply the same category to many events.

For example, in the following screenshot it is shown that the category for the event “AB1C” is “Information”. That means that when any event of kind “AB1C” arrives at Nethunter clients, all actions for the category “Information” will be excuted.



3.10.9 *Users' permissions for devices*

Administrators can grant or deny access to devices according to the logged user.
In order to proceed, select the device on the left tree and check/uncheck the users to grant/deny them access. Optionally, if a recorder was selected, permissions can be propagated to all the cameras in the recorder or to all the devices in the system. Finally, click on the button "Save changes."



Denying access to a device (camera or recorder) has different consequences according to where it is applied :

Devices tree

Cameras and recorders : They are not shown if the logged user has not permission for them.
Maps : They are not shown if the logged user has not permissions for all the cameras attached to them.

Monitor

Only the granted devices to the logged user are shown.

Live

Only the granted cameras to the logged user are shown on the Views.

Schedule

Synchronization tasks : They are not started if the logged user has not permission for the recorder to be synchronized.
Download tasks : They are not started if the logged user has not permission for all the cameras included on it. Moreover, when a recorder is dragged&dropped, only its granted cameras to the logged user are included in the download.

Downloads

They are not shown if the logged user has not permissions for all the cameras included on it.

Events

Only the granted cameras to the logged user are shown on the events.

Settings

Remote configuration : On the devices tree, the logged user will only see the granted recorders and those whose cameras are granted.

Real-time events

Only the events coming from granted devices to the logged user are shown.
Only the granted cameras to the logged user are shown.

Groups / folders information (read more here)

Only the granted recorders / cameras to the logged user are shown.

NOTE
The user “admin” is not shown on the users’ list. He always has permissions for all the devices. Only the active users are shown on the users’ list.

NOTE
The propagation of permissions are only applied to the enabled devices.

NOTE
Keep in mind that the Live-only cameras are registered on a NVVR and on a NV100. When propagating permissions, they will be affected if the selected recorder is both the NVVR or the NV100.

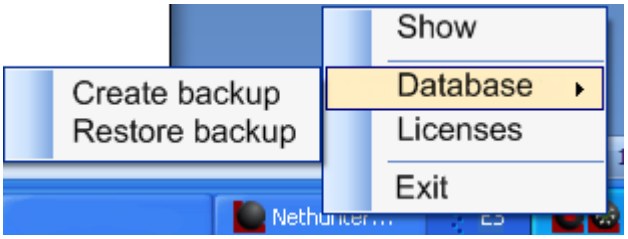
WARNING
The property “Covert” has been removed since version 2.5 so ,by default, all the devices are shown for all users. Administrators will have to deny users access to devices by using this new way.

4 Nethunter server functionalities

Nethunter server (NHServer) offers some important management functionalities. Its options are shown when moving the mouse over the tray icon.

WARNING

Some Windows® versions don't show any tray icon for applications started as a service. If that's your case, stop NHServer and start it as a process from Control Panel.



The option "Show" opens a window showing NHServer logs, only when the tracing setting is enabled. However,if the tracing setting is disabled, an empty window will be shown. If you want to enable logs, contact your Mitsubishi distributor. This functionality is intended to help debugging tasks.

The option "Database" manages NHServer database backups. The database contains info about devices, views, schedules, maps, users, settings, etc. Due to the importance of that data , it's highly recommended to create frequent backups. Please, read section "Backups" to know some important notes about backups.

The option Licenses manages NHServer the DVR licenses. Read the Licensing options & registration section for more details about how licenses work.

5 Nethunter recorder setup (NVVR)

5.1 Nethunter recorder (NVVR) start-up

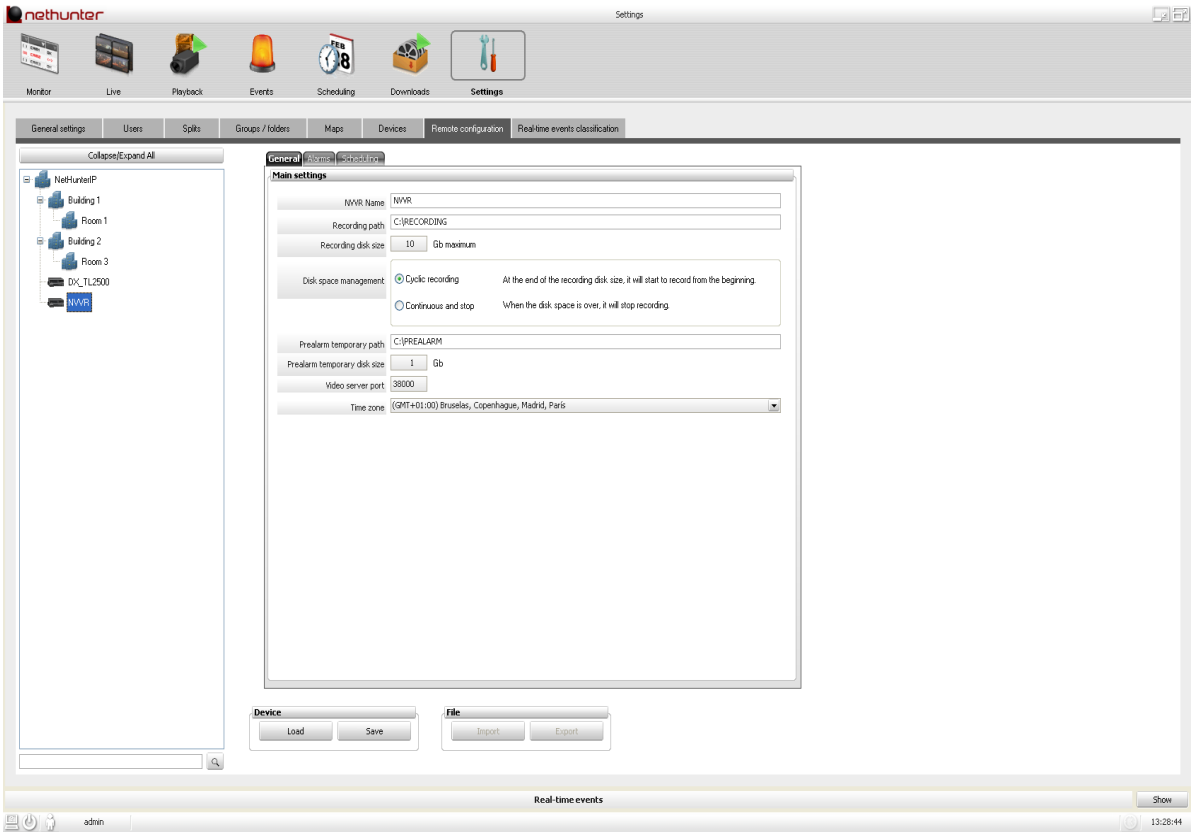
Nethunter recorder (NVVR) is a Windows® process that can be started manually with the Nethunter control panel. The referenced recorder application is located by default in:
C:\Program Files\ Nethunter\NVVR\NHIPnvvr.exe

WARNING
- Two cameras cannot have the same IP address even if they are in two different NVVRs that are configured in the same Server. - The same camera mustn't be configured on different NVVRs because it might cause inconsistences on databases.

WARNING
Don't forget to read the NVVR maintenance advice.

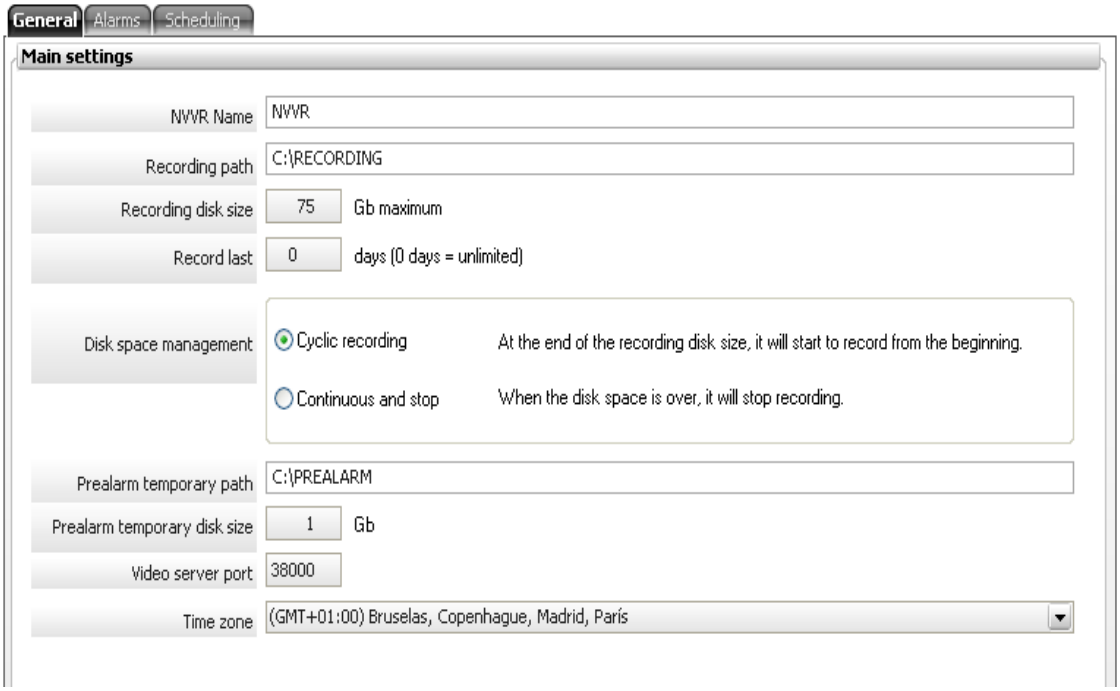
5.2 Recorder Remote configuration

If the device is not created yet, create it firstly and then go on reading.(See chapter 3.10.6 for more details).
The Nethunter recorder settings enable to configure the device from any client through a user with enough permission to perform such action.



5.3 General NVVR configuration

In this section we can configure all NVVR fields. See the table below for detailed information.

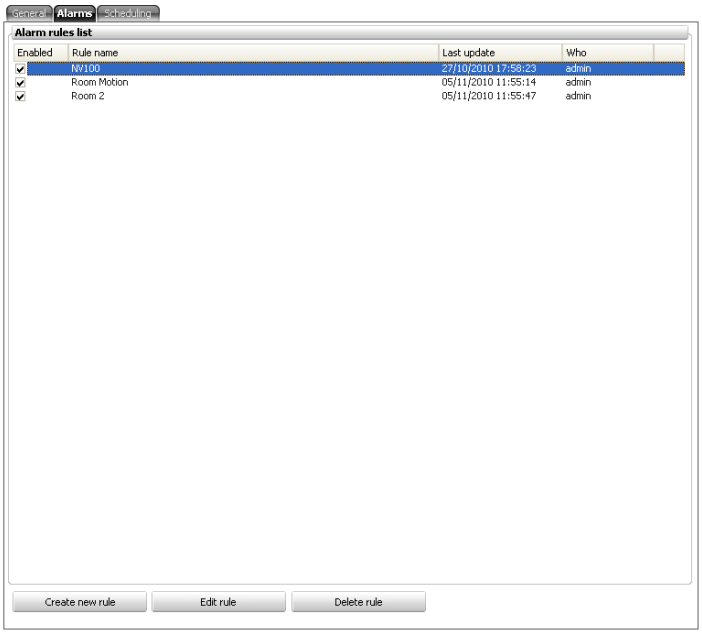


Option	Description
NVVR Name	This field is the name that any server will see when discovering new NVVRs.
Recording path	Path where NVVR recordings are stored.
Recording disk size	Amount of maximum disk space desired for IP cameras recordings. If this value is reduced, all the data exceeding the new size will be deleted instantly. Don't set this value very close to the available disk space. It's recommendable to leave ,at least, a 5% of extra space between the total available disk space and this value. WARNING: THIS VALUE MUST ALWAYS BE BIGGER THAN THE FREE DISK SPACE.
Recording last days	Amount of maximum recorded days. Set 0 for unlimited days. If this value is reduced, all the data exceeding the new period will be deleted after some hours.
Disk space management	**Cyclic recording**: When the specified "Recording disk size" is reached, the oldest recordings start to be overwritten. **Continuous and stop**: When the specified "Recording disk size" is reached, the system stops recording.
Pre-alarm temporary path	Path where NVVR pre-alarm recordings are stored.
Pre-alarm temporary disk size	Amount of maximum disk space desired for IP cameras pre-alarm recordings.
Video server port	Value port used for NVVR to send video images to Nethunter. The value is 38000 by default. Do not change this parameter unless your distributor tells you to do so.
Time zone	Specifies the time zone where the NVVR is located. It's used to work properly with DST.

WARNING
It's not supported to configure any recording path in the system drive as it may cause unexpected malfunctions. Please do not change the PC system time manually when the NVVR is working. It may cause the recordings to be inconsistent. It's not supported to record in any external USB drive as it can lead to unexpected malfunctions. Set a proper recording disk size. Check that this value is always lower than the free disk space. Set a proper recording last days. Check that there is enough free disk space to record those days.

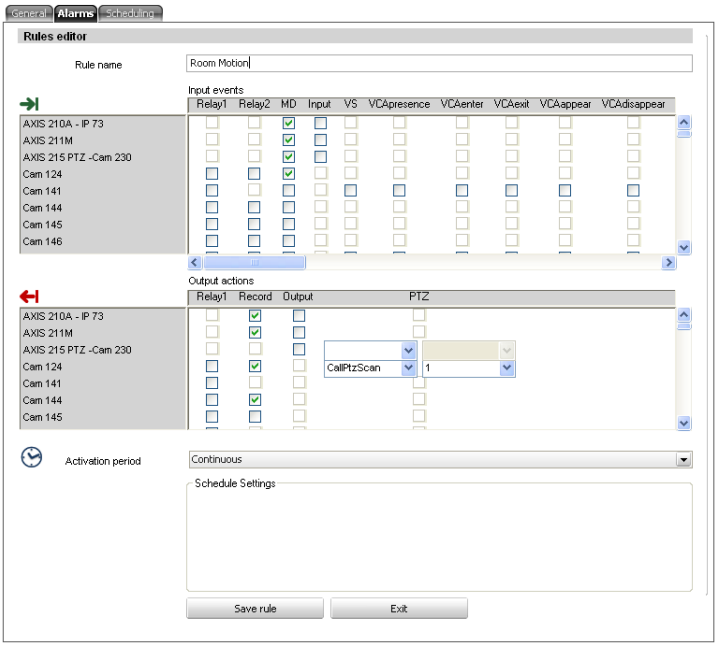
5.4 NVVR alarms configuration

In this section we can configure NVVR Alarms.
The main window of the “Alarms” tab in NVVR Remote configuration screen displays a list with all the created alarms in the NVVR.



The alarms list contains generic information for each alarm in the NVVR (if the alarm is enabled, the rule name, last update date and which user modified the rule the last time).

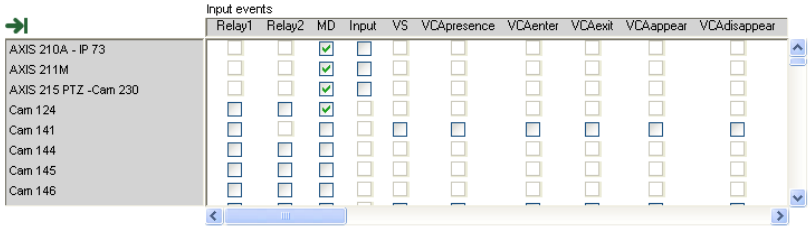
When we select “Create new rule” or “Edit rule” the following screen will appear:



An alarm is a rule composed by an input trigger or event (mandatory) and an output action (optional).

Input events

IP cameras list with its supported functionality (Relays, Motion Detection, Video analysis events, etc.)
The input events depend on the Camera available features.

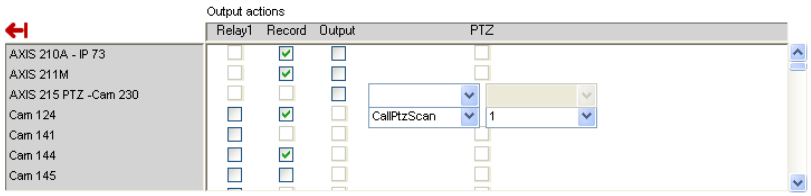


NOTE

If more than one "input events" is selected in a rule, all the selected "input events" have to happen at the same time to trigger the output actions.
The VCA input events apply to all the zones in the camera. It's not possible to specify an alarm on a concrete zone.

Output actions

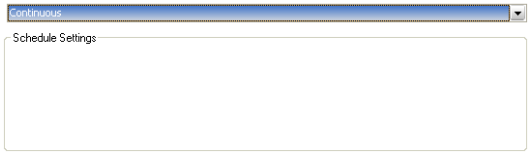
IP cameras list with its supported output actions (Record, PTZ actions, Relays, etc.).
The output actions depend on the Camera available features.



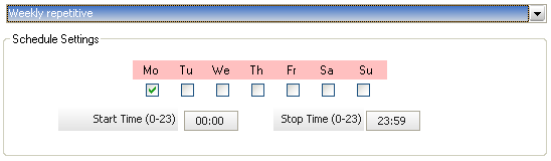
Activation period

This field specifies the time when the alarm is active.

- Continuous: The alarm is active all the time.



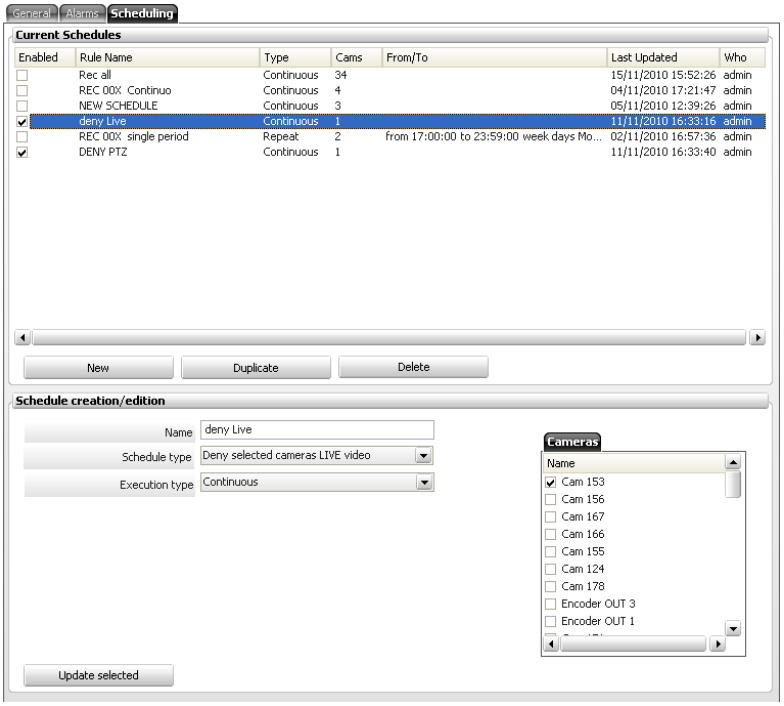
- Weekly repetitive: The alarm is active following a weekly pattern.



- Single period: The alarm is active only once in a specified date and time.

5.5 NVVR scheduling configuration

In this section we can configure NVVR Scheduled tasks.
The main window of the "Scheduling" tab in NVVR Remote configuration screen displays a list with all the created schedules in the NVVR.



The schedules list contains generic information for each schedule in the NVVR (if the schedule is enabled, the schedule name, schedule activation period, number of cameras, schedule period, last update and which user modified the schedule the last time).

When creating a new schedule, the following fields must be filled:

Option	Description
Name	The new schedule name.
Schedule type	One of three different schedule types: • Video RECORDING: when the schedule starts, the selected cameras (from the cameras list) start being recording. • Deny selected cameras Live video: when the schedule starts, the selected cameras (from the cameras list) cannot be viewed from Live tab. • Deny selected cameras PTZ video: when the schedule starts, the selected cameras (from the cameras list) cannot be moved by PTZ controls.
Execution type	One of three different options: • Continuous: The schedule is active all the time. • Weekly repetitive: The schedule is active following a weekly pattern • Single period: The alarm is active only once in a specified date and time.
Cameras	IP cameras that will be affected by the new schedule. All the cameras that have the setting "Live video proxy" enabled won't be able to be added to a recording schedule. Their recording settings must be set in NV100E Remote configuration.

5.6 IP recording disk space calculation

The following information is useful to calculate the amount of disk space necessary for your installation. This table is based in one IP camera in movement, recording in *continuous* mode with different parameters that may affect the compression and disk space.
As a recommendation, the most important parameter to take into account when calculating the disk space usage and also the network usage is the *Bitrate* factor (kbps) that will determine the network bandwidth consumption and picture quality.
For more information see the chapter hardware requirements.

Recording time (min.)	Disk space	Resolution	Bitrate (kbps)	Frame Rate (fps)	Bit-rate control	Comments
5 min.	19 MB	320x240	500 kbps	10	Constant bit rate	Low Quality
5 min.	56 MB	VGA (640x480)	1500 kbps	15	Constant bit rate	Medium Quality
5 min.	94 MB	D1	2500 kbps	20	Constant bit rate	High Quality
5 min.	150 MB	D1	4000 kbps	25	Constant bit rate	Very High Quality

5.7 NVVR Events and errors

On the following list there is a relation between all the possible events that the NVVR IP recorder can generate. These events can be seen in the “Events” tab in Nethunter client.

Event message	Type	Description
RecordingStartExternal (REC-01)	Recording event	Information about the rule in the Alarm Matrix that triggered the recording start.
RecordingStopExternal (REC-02)	Recording event	”Due time expired” if recording stopped because its assigned time span expired, or information about the rule in the Alarm Matrix that triggered the recording stop.
RecordingStartSchedule (REC-03)	Recording event	Information about the Schedule that triggered the recording start.
RecordingStartSchedule (REC-04)	Recording event	Information about the Schedule that triggered the recording stop.
RecordingStartManual (REC-05)	Recording event	
RecordingStopManual (REC-06)	Recording event	”Due time expired” if recording stopped because its assigned time span expired.
RecordingModeChangedExternal (REC-07)	Recording event	IP camera motion detection is triggered
RecordingModeChangedScheduled(REC-08)	Recording event	IP camera motion detection alarm is finished. The alarm duration depends on the “Motion dwell time” parameter on the camera (2 seconds by default)
RecordingModeChangedManual(REC-09)	Recording event	Camera detected a sensor was activated (optional depending on IP camera model)
RecordingModeChangedNotRecording (REC-10)	Recording event	Sensor is disabled.
RecordingHardStop (REC-11)	Recording event	The recorder started recording due to an alarm trigger. The alarm could be produced by motion detection or by sensor activation.
RecordingFaultRecovered (REC-12)	Recording event	Alarm recording is finished at the specified timestamp. It finishes immediately when the Motion detection off or Sensor off event is received.
AlarmOn (ALA-01)	Alarm event	Information about the triggered alarm.
AlarmOff (ALA-02)	Alarm event	Information about the alarm disabled.
AlarmRuleOn (RUL-01)	Rule event	Information about the rule that was triggered on, its alarms, and actions triggered by it.
AlarnRuleOff (RUL-02)	Rule event	Information about the rule that was triggered , its alarms and actions triggered by it.
SystemStartUp (SYS-01)	System event	Information about the system.

SystemShutdown (SYS-02)	System event	Information about the system.
SystemStart (SYS-03)	System event	Information about the system.
SystemStop (SYS-04)	System event	Information about the system.
SystemSettingsChanged (SYS-05)	System event	Name of the configuration parameter and its new value.
CameraAdded (CAM-01)	Camera event	IP address and port of the NVVR that performed this action.
CameraRemoved (CAM-02)	Camera event	IP address and port of the NVVR that performed this action.
CameraSettingsChanged (CAM-03)	Camera event	Name of the configuration parameter and its new value.
CameraConnected (CAM-04)	Camera event	
CameraDisconnected (CAM-05)	Camera event	Cause of disconnection.
CameraReplaced (CAM-06)	Camera event	IP address and port of the NVVR client that performed this action.
ErrorDiskLimitReached (ERR-01)	Error event	
ErrorNetworkConnectionLost (ERR-02)	Error event	Identifier of the device or URI whose connection.
ErrorDiskAccessFailed (ERR-03)	Error event	Path of the file that failed to access the disk.
ErrorWrongMacAddress (ERR-04)	Error event	Found and expected MAC addresses.
ErrorNetworkConnectionOverflow (ERR-05)	Error event	Information about the connection that overflowed.
ErrorDiskFull (ERR-06)	Error event	Path to the file that failed to access the disk.
ErrorRecordingQueueOverflow (ERR-07)	Error event	Information about memory usage and limits.

The following errors don't trigger any event.

Message	Type	Description
Client not connected to server	Error NVVR	The Nethunter Server is not connected to NVVR device. It can be caused due to: - The server is down. - There has been a connection problem.
This camera is not reachable in the network using specified parameters. Please check IP address and port or check camera network connection if error persists.	Error NVVR	It can be caused due to: - The operation has timed out. - A mistake entering the IP or port of the camera. - The camera is not reachable from the NVVR through the network.
Wrong login. Please check user and password.	Error NVVR	User name and/or password assigned when creating a new NVVR were not correct.
Device is not reachable in network using specified parameters. Please check IP address and port or check device network connection if error persists.	Error NVVR	The connection to remote NVVR device was closed.
Error updating camera settings.	Error NVVR	The settings could not be updated in the NVVR or in a camera for any reason.
This camera has schedules configured. Please delete them first.	Error NVVR	The action could not be taken because the camera has schedules configured. If a camera needs to be deleted, the schedules and alarms must be deleted first.
This camera has rules configured. Please delete them first.	Error NVVR	The operation could not be taken because the camera has alarms configured. If a camera needs to be deleted, the schedules and alarms must be deleted first.
Maximum third party camera licenses reached. Until license upgrade, you can add this camera only for live pourpose.	Error NVVR	The Third Party license does not allow the action that is trying to be done.
The camera is not reachable in the network.	Error NVVR	Ping to the camera failed. Camera is not reachable in the network. The NVVR has to be able to ping the Camera.
Impossible connect to camera video channel.	Error NVVR	Connecting to the video stream of the camera failed.

Please try again later.		The camera can be pinged but there has been a problem with the RTSP stream. Possible reasons: - The RTSP port is blocked by any firewall or antivirus in the network. - The IP camera is being used by some other software.
The video or audio encoding configuration for this camera is not supported.	Error NVVR	The video or audio encoding currently configured in the camera is not supported by the driver. The camera cannot be added to the NVVR unless its internal settings of video or audio encoding are changed.
Impossible connect to camera alarms notification channel. Please check if it is enabled on camera.	Error NVVR	Connecting to the alarms notification port of the camera failed. Check if there's any firewall or antivirus blocking that port.
Wrong argument passed to the recorder	Error NVVR	One of the method arguments is wrong, or has a wrong format.
Error changing IP address	Error NVVR	The method could not assign the request new IP address. Possible reasons: - The IP is already used in the network. - The new IP is not in the same network range as the NVVR is. - The connection to the camera has failed.
Timeout. The operation (a remote call to the NVVR API) has timed out.	Error NVVR	It can be caused due to: - The connection to the NVVR was lost. - Network is collapsed due to high traffic
Not logged. The NVVR client is not logged in to the NVVR server.	Error NVVR	It can be caused due to: - The connection to the NVVR was lost. - The server didn't log in yet
Connection closed. Connection to the NVVR was closed.	Error NVVR	It can be caused due to: - The connection to the NVVR was lost.
Video not connected. The NVVR video client is not connected to the remote NVVR Video Server	Error NVVR	It can be caused due to: - The connection to the NVVR was lost.
Camera is Live only. The operation could not be performed because the camera is in LiveOnly mode	Error NVVR	
Camera not configured. The camera is not configured in the NVVR.	Error NVVR	
Forbidden. The requested operation is forbidden	Error NVVR	
Driver not found. A proper driver was not found to handle a camera when adding it to the NVVR	Error NVVR	
Protocol not supported. The protocol specified to connect to the remote NVVR API is not supported.	Error NVVR	
Api connection failed. Connecting to the camera API failed. Camera is not reachable.	Error NVVR	
Video connection failed. Connecting to the video stream of the camera failed. Camera is not reachable	Error NVVR	
Alarms connection failed. Connecting to the alarms notification port of the camera failed. Camera is not reachable.	Error NVVR	
Version no compatible. The version of Nethunter is not compatible with the NVVR version	Error NVVR	

Unknown system error	Error NVVR	Unknown error. It’s very unlikely to appear.

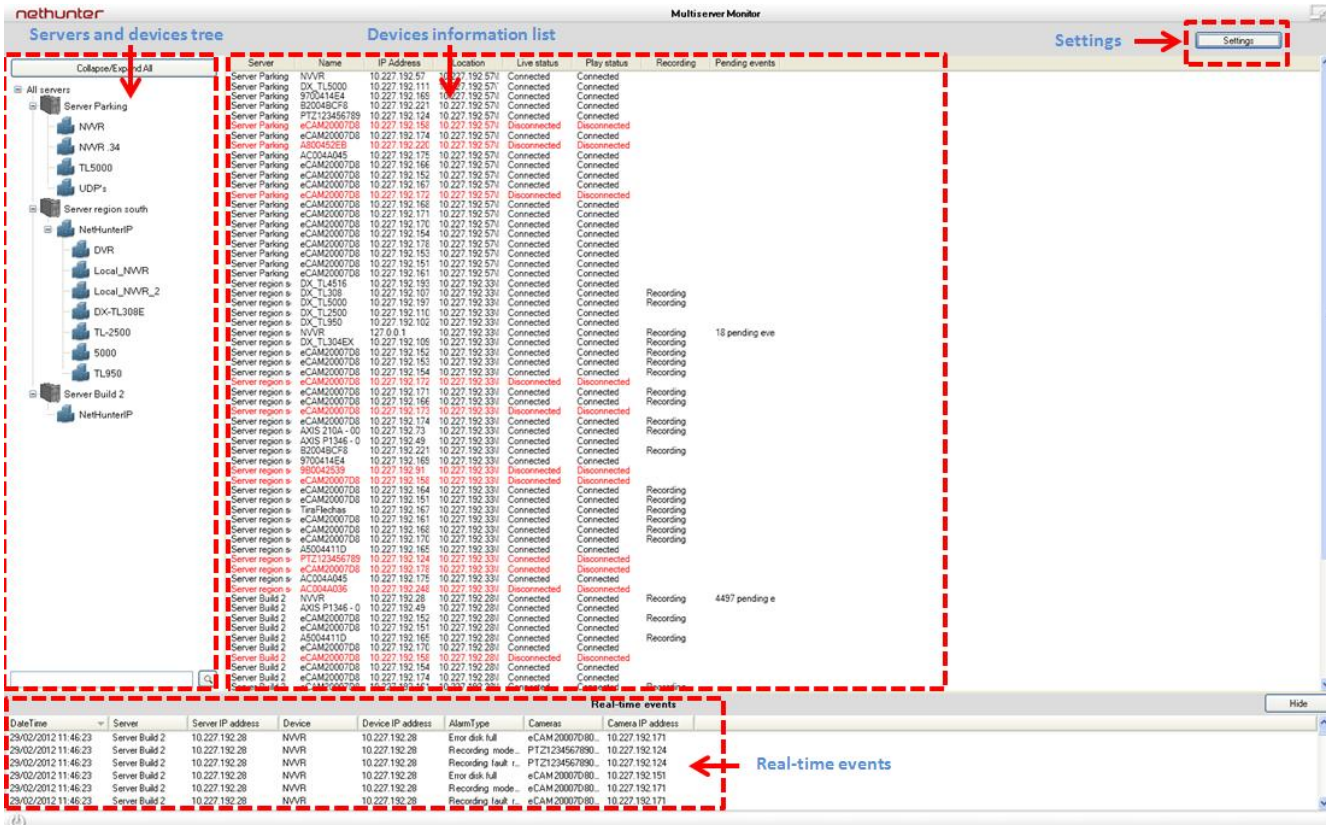
5.8 NVVR additional modules

The NVVR device allows additional software to interact with it through its own API.
In order to be able to use any additional module, a “Third-party integrators” license is needed.

6 Nethunter Multiserver Monitor

This module is able to monitor more than one NHServer. It's suitable for multiserver architectures. However, it has some limitations so it can't replace NHClient for the main admin tasks.

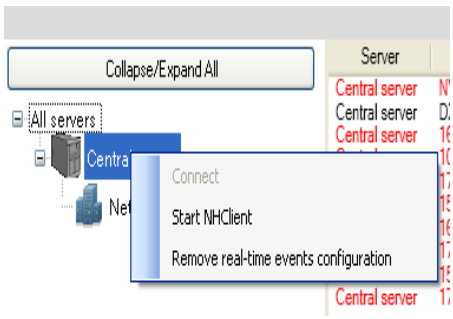
WARNING
At start-up, this module retrieves information from all the registered servers. This operation might last a while. Please, be patient.



6.1 Servers and devices tree

All registered servers are shown in the tree on the left. For each server, its groups and devices are listed under it. When any node in the tree is clicked with the left mouse button, all the devices located under it are shown in the device information list.

When any node in the tree is clicked with the right mouse button, a pop-up menu is shown with the following commands :



Connect : Tries to establish the connection to that NHServer. This option is only enabled when that server is disconnected.

Start NHClient : NHClient is launched,but with the Settings option disabled. The module NHClient must be installed on the same PC and not running. It automatically connects and opens a session to that NHServer with the user / password configured in settings. This option is only enabled when that server is connected.

Remove real-time events configuration : All the local real-time events configuration for that server is removed. The next time Multiserver Monitor connects to that server, the configuration will be retrieved. This option is only enabled when that server is connected

6.2 Devices information list

This list shows devices information such as its server, name, ip address, location in the tree, live status, play status, recording state and the number of real-time events received. It is very similar to the option Monitor in NHClient.
The pending events column provides info about the real-time events received for a specific device, but only those configured to be shown on the real-time events panel. It can be set to 0 by double-clicking on it. It's useful when end-users want to notice any event received for a specific device.
All columns allow descending or ascending sorting by clicking on them and can be placed in other position just by dragging and dropping them.

6.3 Real-time events

Multiserver Monitor receives all the RT events sent by the devices and dispatched by the NHServers. This list shows the same info as the one in NHClient . Read the section Real-time events in NHClient for more information.
It's also possible to view the live stream from the cameras that caused the event. To do so, double-click any event from the list. When done, the module NHClient will be launched, it will connect to the corresponding NHServer and will show Live images from the cameras of the event. The module NHClient must be installed on the same PC and not running. Only users with Live rights are allowed to do it.

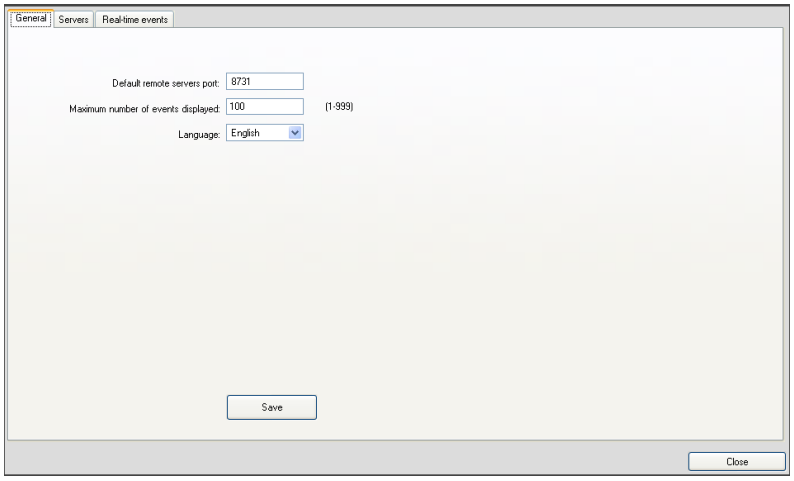
6.4 Settings

All the configuration data can be changed in this option. There are 3 different kind of settings : General, Servers and Real-time event classification.

6.4.1 General

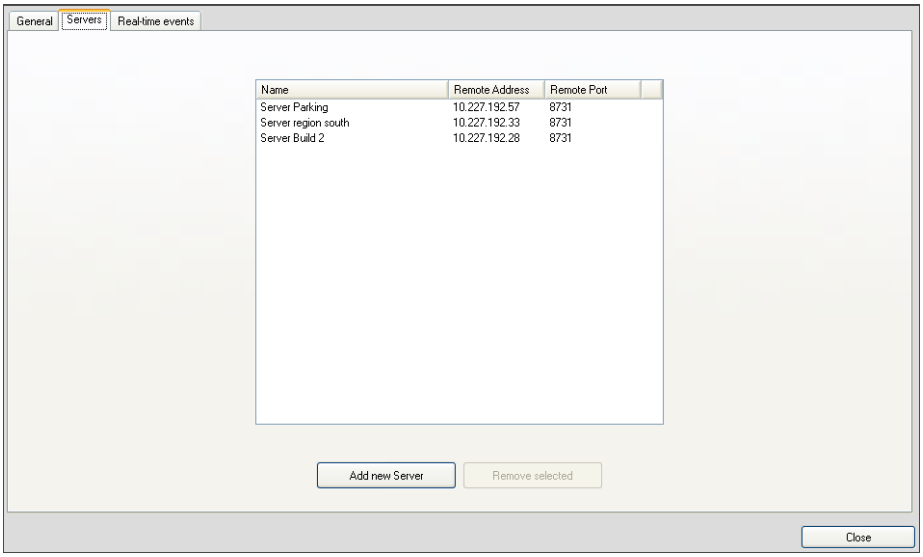
Three important parameters can be changed in this tab :

Default server port : Default network port for connecting to NHServer. Check your firewalls or network filters in order to confirm that this port is opened on the NHServers computers. Don't change it unless your Mitsubishi distributor ask you for it.
Maximum number of RT events displayed : Same setting as in Settings → General in NHClient.
Language : Choose the language you would like to use.

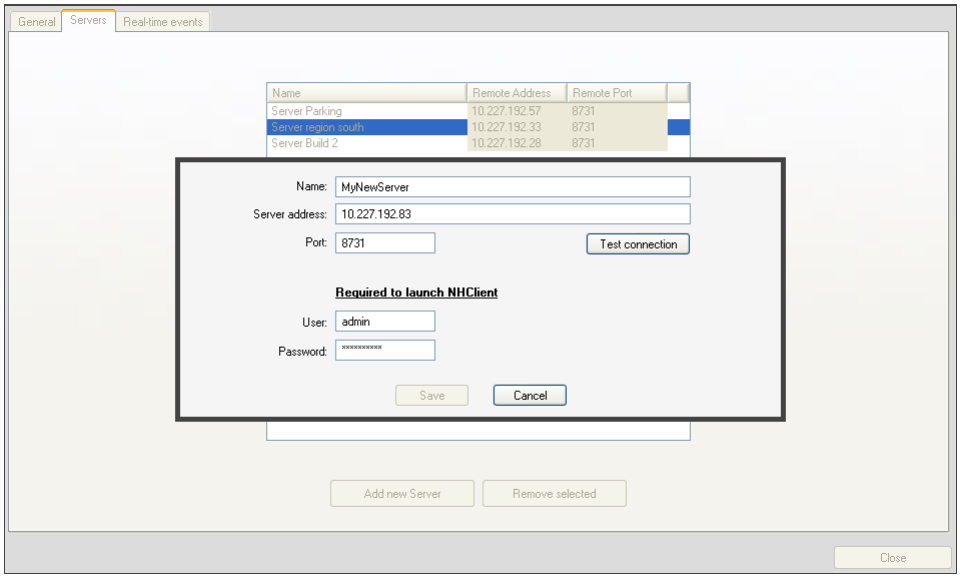


6.4.2 Servers

NHServers can be added or removed in this tab. Moreover, a list containing all previous added servers is shown.



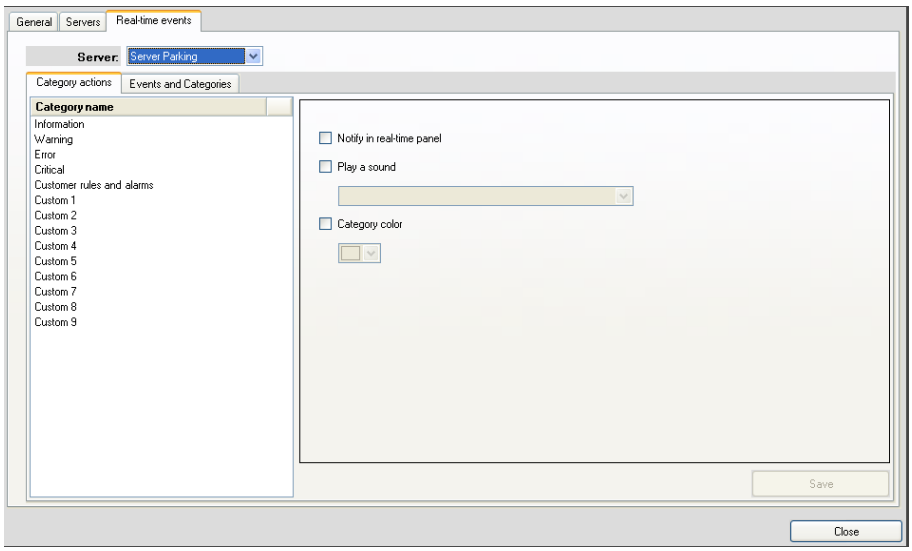
Add new server : A new window is shown where all data for the new server can be updated. Users must fill in a name, the ip and the port. The button “Test connection” will try the connection to that NHServer by using those network parameters.
Moreover,a valid NH user/ password must be specified. This user is used for connecting to that server when NHClient is launched from Multiserver Monitor.



Remove selected server : The selected server and all its configuration is removed.

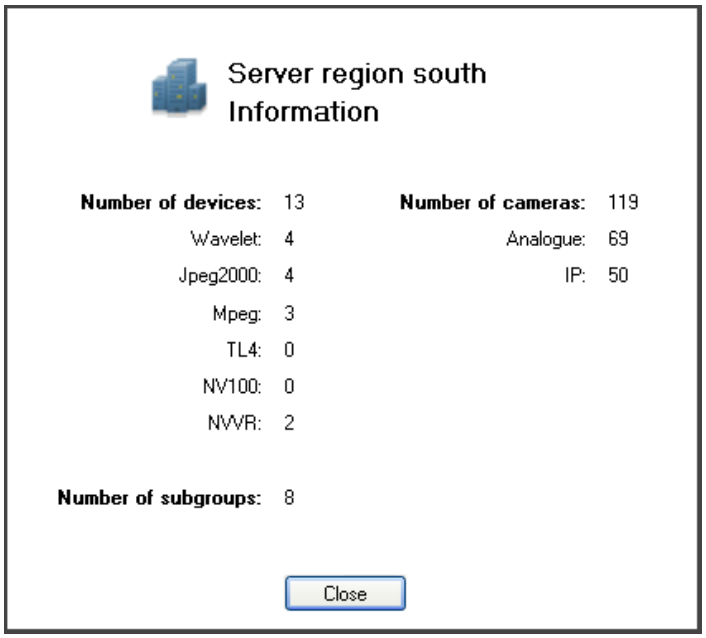
6.4.3 Real-time events

In this tab, all real-time events settings can be configured. It's very similar to the option "Real-time events classification" in Settings → General in NHClient. The only difference is that the action "Show real-time live video" is not present here. Please, read that section in this manual to get more information.
All this configuration is retrieved from the NHServer once the server is added. After that, all changes made on that configuration are stored locally, so they only apply to the local Multiserver Monitor.



6.5 Groups / Folders information

Similarly as in NHClient, every group contains information about how many devices and subgroups are contained under it. In order to get that information, double-click on any group. See an example below.



7 Appendixes

7.1 DVR resolutions according to the "DVR Decompression Size" parameter

DVR Model	Very Small	Small	Medium	Large
400	84x137	168x275	337x550	674x550
950/2500	84x142	169x284	339x568	678x568
4509/4516/5000	86x71	173x143	347x286	694x572
304/308/5716/TL4	**Does not affect.**			

7.2 Hardware requirements (IP Cameras system)

The table below shows the hardware requirements (only on IP installations) needed for a Nethunter security system. Read it as a general guideline because there are many other aspects to take into consideration as bitrate, fps, if any antivirus is installed on the computer, hard disk performance, number of screens, etc.
As a general rule, in order to avoid malfunctions, the suitable computer is that whose CPU is always working under 95% usage.

<table>
<tr><th>No. cameras</th><th>Server / Client / NVVR*</th><th>Server</th><th>Client</th><th>NVVR*</th></tr>
<tr><td>2</td><td>Intel® Core™2 Duo @ 1.8 GHz
4 GB RAM
Fast Ethernet 100 Mbps</td><td rowspan="2">Intel® Core™2 Duo @ 1.8 GHz
2 GB RAM
Fast Ethernet 100 Mbps</td><td rowspan="2">Intel® Core™ 2 Duo @ 2.6 GHz
2 GB RAM
Fast Ethernet 100 Mbps</td><td rowspan="2">Intel®Core™ 2 Duo @ 2.6 GHz
2 GB RAM
Fast Ethernet 100 Mbps</td></tr>
<tr><td>4</td><td>Intel® Core™2 Duo @ 2.6 GHz
4 GB RAM
Fast Ethernet 100 Mbps</td></tr>
<tr><td>6</td><td>Intel® Core™2 Quad @ 2.5 GHz
4 GB RAM
Fast Ethernet 100 Mbps</td><td rowspan="2">Intel® Core™2 Duo @ 2.2 GHz
Fast Ethernet 1000 Mbps</td><td rowspan="2">Intel® Core™2 Quad @ 2.5 GHz
2 GB RAM
Fast Ethernet 100 Mbps</td><td rowspan="2">Intel® Core™2 Quad @2.5 GHz
2 GB RAM
Gigabit Ethernet 1000 Mbps</td></tr>
<tr><td>8</td><td>Intel® Core™2 Quad @ 3.0 GHz
4 GB RAM
Fast Ethernet 100 Mbps</td></tr>
<tr><td>16</td><td>Intel® Core™ i5 @ 2.8 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td>Intel® Core™2 Quad @ 2.5 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td>Intel® Core™2 Quad @ 2.5 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td></td></tr>
<tr><td>24</td><td>Intel® Core™ i5 @ 3.4 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td rowspan="2">Intel® Core™2 Quad @ 3.0 Ghz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td rowspan="2">Intel® Core™2 Quad @ 3.2 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td><td rowspan="2">Intel® Core™2 Quad @3.0 Ghz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td></tr>
<tr><td>32</td><td>Intel® Core™i7 @ 3.2 GHz
4 GB RAM
Gigabit Ethernet 1000 Mbps</td></tr>
<tr><th colspan="5">Common requirements</th></tr>
<tr><td>Video card</td><td colspan="4">Standard VGA graphics adaptor</td></tr>
<tr><td>Display</td><td>1280x1024 or higher</td><td>1024x768 or higher</td><td>1280x1024 or higher</td><td>1024x768 or higher</td></tr>
<tr><td>Multi Display</td><td>NVIDIA® GeForce® 9600GT**
ATI® EAH4850</td><td></td><td>NVIDIA® GeForce® 9600GT**
ATI® EAH4850</td><td></td></tr>
<tr><td>O.S.</td><td colspan="4">Windows® XP, Vista and 7 (32-bits edition)</td></tr>
<tr><td>HDD</td><td>See table</td><td>80 GB</td><td>120 GB</td><td>See table</td></tr>
</table>

* Without VideoAnalytics module.
** Multi Display may not work under Windows® XP.

NOTE

In order to know the hardware requirements for installations with DVR devices, please contact your dealer.

The operating system Windows® XP takes less cpu usage than Windows® 7 while showing pictures. So, it is recommendable to install Windows® XP whenever possible (mainly on NHClient PCs).

Now, we can view a table with the storage capacity necessary for different NVVR configurations (2, 4, 6 … cams and different quality).

No. cameras	Very High Quality VHQ (4000kbps@D1)		High Quality HQ (2500kbps@D1)		Medium Quality MQ (1500kbps@VGA)		Low Quality LQ (500kbps@CIF)	
2	3.3 GB/h	80 GB/day	2.1 GB/h	50 GB/day	1.3 GB/h	30 GB/day	0.4 GB/h	10 GB/day
4	6.6 GB/h	160 GB/day	4.2 GB/h	100 GB/day	2.5 GB/h	60 GB/day	0.8 GB/h	20 GB/day
6	9.9 GB/h	240 GB/day	6.3 GB/h	150 GB/day	3.7 GB/h	90 GB/day	1.2 GB/h	30 GB/day
8	13.3 GB/h	320 GB/day	8.4 GB/h	200 GB/day	10 GB/h	120 GB/day	1.6 GB/h	40 GB/day
16	26.6 GB/h	640 GB/day	16.7 GB/h	400 GB/day	20 GB/h	240 GB/day	3.2 GB/h	80 GB/day
24	39.9 GB/h	960 GB/day	25.1 GB/h	600 GB/day	30 GB/h	360 GB/day	4.8 GB/h	120 GB/day
32	53.2 GB/h	1280 GB/day	33.3 GB/h	800 GB/day	40 GB/h	480 GB/day	6.4 GB/h	160 GB/day

NOTE

In order to know the storage capacity for systems with DVR devices, please contact your dealer.

7.3 Installation use cases & recommendations

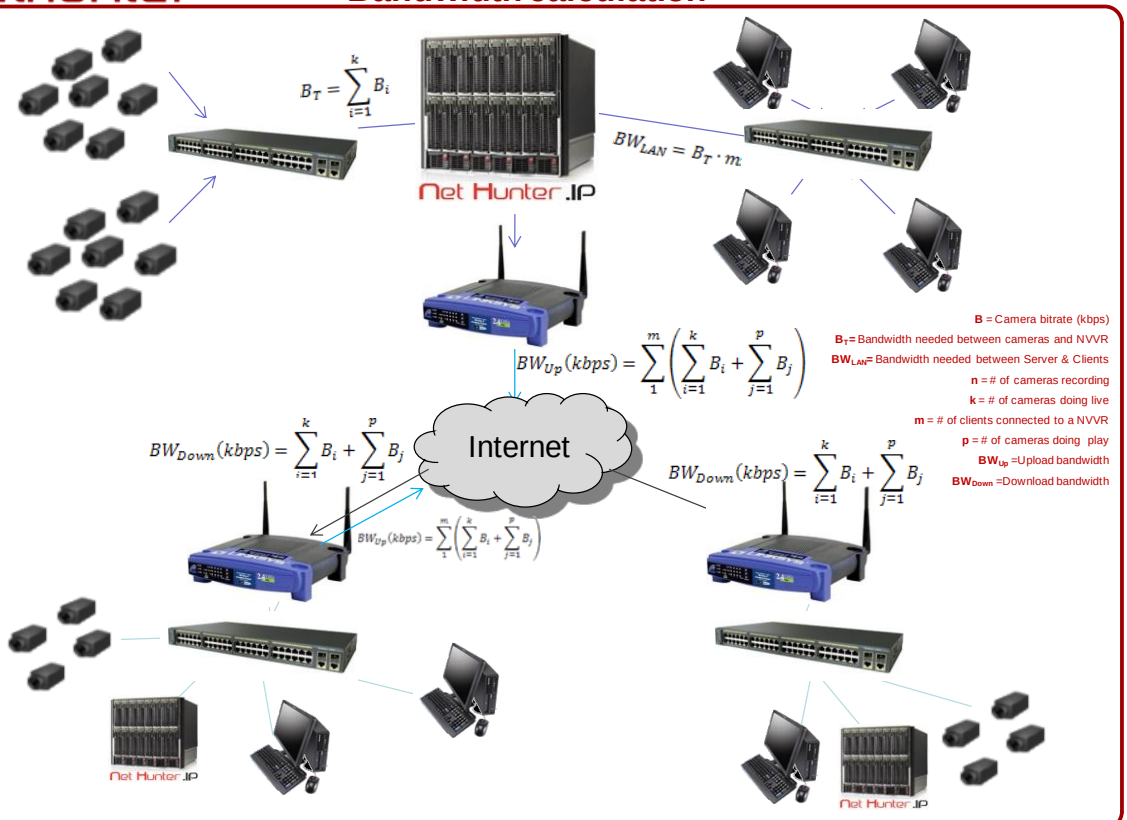
Installation type	Minimum recommended hardware
Small IP/DVR installation 1 to 4 IP cameras and/or 1 Mitsubishi DVR Single PC, server + client architecture	Intel Core 2 Duo 2 Gb RAM Standard graphics card with 256 Mb video memory. 10/100 Mbps Network card
Medium IP installation Up to 16 IP cameras Single PC, server + client architecture	Intel Core i5 4 Gb RAM ATI graphics card with 256 MB video memory. 10/100 Mbps Network card.
Large IP installation More than 16 IP cameras Single PC, server + client architecture	Intel Core i7 4 Gb RAM ATI graphics card 256 MB video memory. 10/100/1000 Mbps Network card. *This is not a recommended installation if the IP cameras continuous recording is critical. Video play or live operations and also exports may damage recorded video. Be careful.*
Medium-Large DVR installation More than 3 DVR Single PC, server + client architecture	Intel Core 2 Quad 4 Gb RAM ATI graphics card ATI 256 MB video memory. 10/100/1000 Mbps Network card.
Medium-Large DVR & IP installation Various IP cameras & DVR (undefined) Client-Server architecture	**Server :** Intel Core 2 Quad with any graphics card. 4 Gb RAM 10/100/1000 Mbps Network card or multiple cards depending on amount of devices **Thin clients :** Only monitor and administration tasks: settings, scheduling, … Intel Core 2 Duo with any graphics card. 4 Gb RAM 10/100/1000 Mbps Network card or various depending on amount of devices and network topology **Powerful clients :** Displaying lots of simultaneous cameras in live or play Intel Core i5 4 Gb RAM ATI graphics card 256 MB video memory. 10/100/1000 Mbps Network card. ***Recommended architecture for high performance installations. This configuration allows you to connect dynamically many clients to a single server without affecting the IP recording.***
Reliable server – client architecture IP recording on server (NVVR)	**Server:** Server machine with redundancy on hardware mechanical parts. (Fan, Hdd, etc) Same CPU, memory and network as Medium-large installations (see previous points) **Clients:** Since on the client machine is not possible to loose information, it is not really necessary to make it redundant or safer than a standard powerful PC. Follow the previous recommendations points. ***Recommended architecture for high performance & reliable installations.***

NOTE

The operating system Windows® XP takes less cpu usage than Windows® 7 while showing footage. So, it is recommendable to install Windows® XP whenever possible (mainly on NHClient PCs).

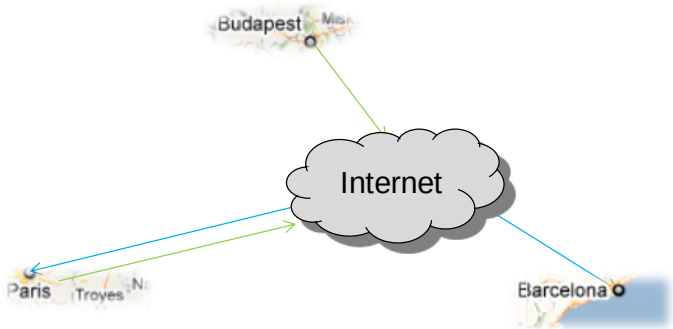
7.4 Network requirements. Bandwidth calculation

nethunter **Bandwidth calculation**


$B_T = \sum_{i=1}^{k} B_i$
$BW_{LAN} = B_T \cdot m$
Net Hunter .IP
$BW_{Up}(kbps) = \sum_{1}^{m}\left(\sum_{i=1}^{k} B_i + \sum_{j=1}^{p} B_j\right)$
$BW_{Down}(kbps) = \sum_{i=1}^{k} B_i + \sum_{j=1}^{p} B_j$
Internet
$BW_{Down}(kbps) = \sum_{i=1}^{k} B_i + \sum_{j=1}^{p} B_j$
$BW_{Up}(kbps) = \sum_{1}^{m}\left(\sum_{i=1}^{k} B_i + \sum_{j=1}^{p} B_j\right)$
Net Hunter .IP
Net Hunter .IP
B = Camera bitrate (kbps)
B_T= Bandwidth needed between cameras and NVVR
BW_{LAN}= Bandwidth needed between Server & Clients
n = # of cameras recording
k = # of cameras doing live
m = # of clients connected to a NVVR
p = # of cameras doing play
BW_{Up} =Upload bandwidth
BW_{Down} =Download bandwidth

nethunter **Installation example**

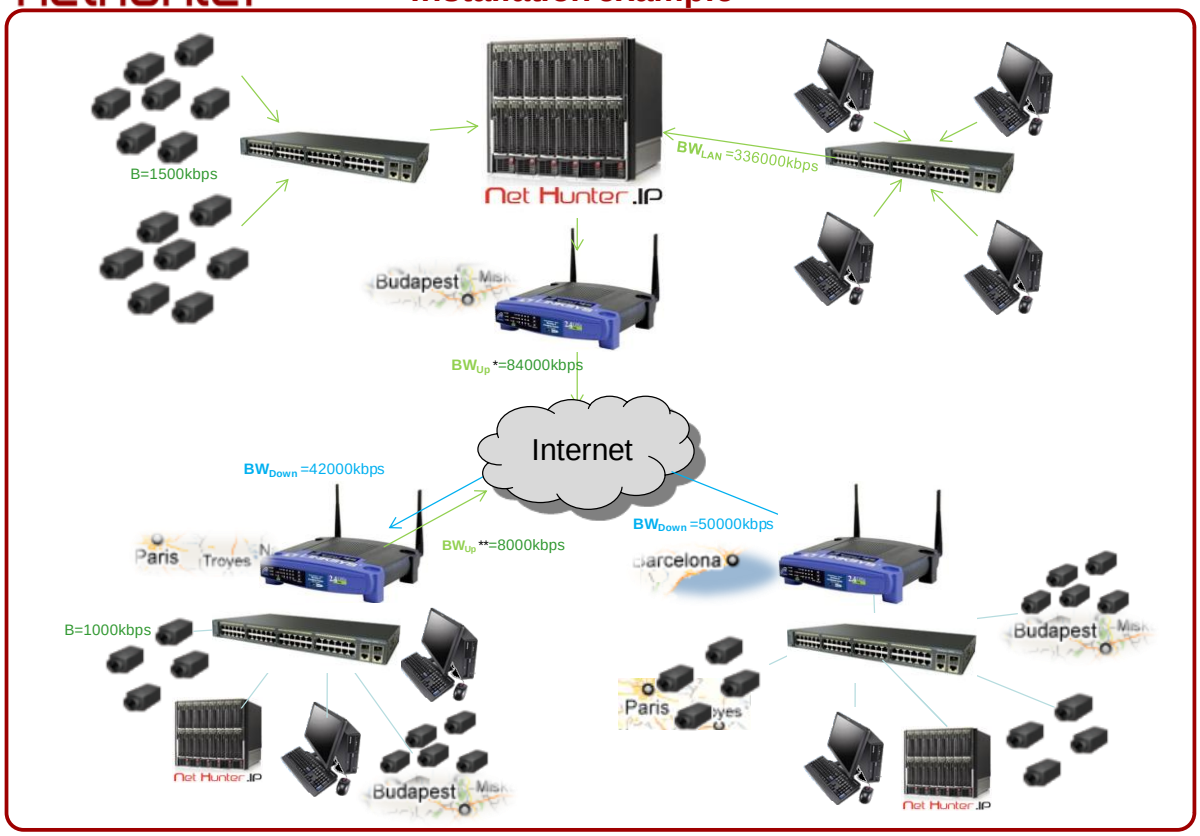
Budapest has a nethunter standard installation with 14 IP cameras, all the cameras have the same bitrate,1500kbps.
They want to know the required upload speed in Budapest to allow both Barcelona and Paris connect to Budapest installation.



Paris has a nethunter smart installation with 4 IP cameras, all the cameras have the same bitrate,1000kbps.
They want to know the required upload speed in Paris so that Barcelona can connect to their cameras.
They also need to know the required download speed in Paris so that they can connect to the Budapest nethunter installation.

Barcelona has a nethunter smart installation with 4 IP cameras.
They want to know the required download speed in Barcelona so that they can connect to both Budapest and Paris installation.

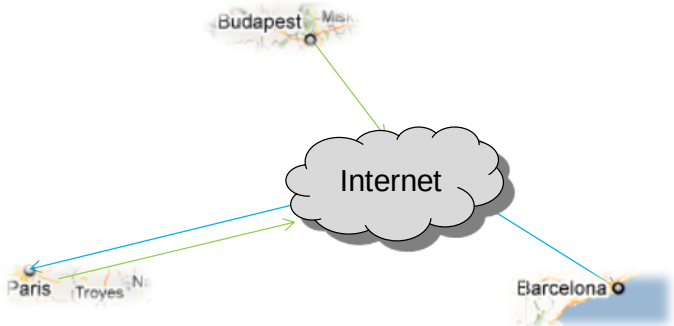
Installation example



* Considering 2 remote clients doing live and play of all cameras ** Considering 1 remote client doing live and play of all cameras

Installation example

Budapest requires 84000kbps of upload speed so that Barcelona and Paris can connect to the installation.
The maximum upload speed available in Budapest is 4096Kbps. Workaround: It's necessary to limit the NVVR bandwidth to 4096kbps.



Considering the speed limitation applied in Budapest installation (4096kbps), the required download speed in Paris is 4096kbps.
The required upload speed in Paris so that Barcelona can connect to them is 8192kbps.
No speed limitation is required because Paris has a 8192kbps upload speed connection.

Considering the speed limitation applied in Budapest installation (4096kbps), the required download speed in Barcelona to connect to both Paris and Budapest installations is 12288kbps.

8 Notes

8.1 DVR management

8.1.1 DVR connection & Nethunter ports limitation

Due to memory limitation, NHServer is not able to connect unlimited dvrs. Each dvr model has different memory requirements. Ask for help to your Mitsubishi distributor to manage more than around 100 dvrs.

8.1.2 On-Demand connection & disconnection

All the DVR requests that are different from Live are undertaken on-demand when any client requests them.
Special operations (PTZ, remote configuration, play) will connect and disconnect extra DVR ports on-demand.

8.1.3 Get Events not available for old DVR models

Due to DVR SDK limitations it is not possible to synchronize alarm events with the old DVR models (Models that are not supported: DX-NT400E, DX-NT430E, DX-TL950E, and DX-TL2500E)

8.1.4 Disconnection effect: frozen images

During DVR ports disconnection, Nethunter server display capabilities will have a “frozen” effect. All the connected clients displaying video could observe videos are stopped for few seconds.

8.1.5 Decompression CPU: discarding images

DVR video decompression (live) is a high CPU usage operation.
When viewing multiple DVR cameras together at the same client, the CPU consumption could be close to 100%. At this time, to be able to display all the cameras in a reasonable time and ensure client interface response time, Nethunter will start discarding images by decreasing the display frame-rate.
To minimize this effect, it is possible to reduce the DVR camera quality settings and also the client decompression settings to a lower quality.

8.1.6 Visual defects in TL304/304EX/308/5716

Images with sudden changes might show some visual defects (horizontal lines). This only happens when picture size in recording settings is set to CIF or 4CIF

8.2 Client-Server

8.2.1 Server disconnection

If the connection with server is lost (network issue, server shutdown …) all the affected clients will be informed about the connection failure. To connect again with the server, Nethunter client needs to be closed and started again to start a new connection with the server.

8.2.2 Settings administration

Once a client connects to settings screen, all the client extra monitors screens will become blank in order to help the administrator to change the settings as appropriate, avoiding synchronization issues between screen components and new or deleted objects.
To update the devices section all clients need to be locked in order to apply correctly the recently changed settings, parameters, new devices or removed devices. This will simplify the device changes synchronization to all the clients immediately after the settings operation. During the settings operation time all the clients will be “locked” until the device control is released.

8.3 Devices

8.3.1 IP Camera settings

There is one parameter on the IP camera configuration that is not compatible with Nethunter.
On the Video settings section, keep the parameter Profile to the default value “Simple Profile” in order to have the system working correctly.
If this setting has an incorrect value, the video live, playback and also the recorded video will show reverse jumps during a normal viewing. Just changing this parameter will solve this erratically effect.

8.3.2 IP camera network configuration

In some cases, it is required that your network topology allows PING between Nethunter NVVR and the cameras. Otherwise the cameras will be shown as not connected in Monitor tab.
Check that the IP cameras are perfectly accessible from the NVVR through the http(s) port and the specific camera ports for streaming.

8.4 Backups

8.4.1 Database backups between different NH versions

Database backups between different Nethunter release versions might not work. If an older database backup has to be restored into a newer release version, try todo it in the usual way (from “Restore database” on NHServer). If you face any problem, try the following safer way :

1. Uninstall newer Nethunter version deleting the database (in case it is installed).
2. Install the Nethunter version corresponding to the old database backup.
3. Import the old database backup by double-clicking on the sever icon and selecting the option “Restore backup”
4. Uninstall Nethunter without deleting the database.
5. Install the newer Nethunter version

Let's see an example: we have v.2.2 installed on our system and we would like to restore the database from a Nethunter v2.0. We must follow the following steps:

1. Uninstall Nethunter v2.2 deleting the database. If you have important data on it, create a backup previously.
2. Install Nethunter v2.0
3. Import the database backup from v2.0 by double-clicking on the server icon and selecting the option “Restore backup”
4. Uninstall Nethunter v2.0 **without** deleting the database.
5. Install Nethunter v2.2.

WARNING

These steps work only between any versions starting with the same figure. In other words, we can only import any previous 1.x version from any 1.y version and between any previous 2.x version from any 2.y version (where x and y are different).

8.5 Performance under high CPU consumption conditions

Any PC on the network shouldn’t have high cpu usage (around 95-100%). If the client is having it, pictures will be discarded and end-users will notice poor response time for any action. On the NVVR-side, recordings might fail. On the server-side, pictures and real-time events will be discarded. In the worst case, even memory leaks might appear.

8.6 NVVR maintenance advices

The NVVR is a video recording system. Due to the importance of the stored data, users should follow some steps to keep the system in good conditions :

- The PC where the NVVR is running mustn't be closed abruptly.
- The NVVR process mustn't be closed abruptly.
- The hard disk where the video is going to be recorded must have high performance, ideally a RAID configuration.
- It's not recommendable to install high cpu consumption sofware in the same PC (such as antivirus).
- It's not recommendable to set the recording path in the same hard disk where the operating system is installed.

If the NVVR is closed abruptly, the recording indexes might be corrupted. If so, the NVVR might slow down certain operations such as start-up or closing down.

8.7 Special scenario : two NHServers connected to the same NVVR

In some network architectures, it's suitable to connect two NHServers to the same NVVR. Usually, one NHServer is connected in the same LAN of the NVVR (for supporting local NHClients) and another NHServer is connected remotely through a broadband (for supporting remote NHClients). See below a typical diagram :

Administrators must keep in mind that both NHServers and the NVVR store information about the recording cameras so, in this scenario, administrators must follow some important considerations in order to avoid database inconsistences. The steps to follow are :

1. Add the NVVR in one of the NHServers (for example, let's say NHServer1). Read the section where adding the NVVR is explained for more details.
2. Add the recording cameras to the NVVR through that NHServer. Read the section where adding cameras to the NVVR is explained for more details.
3. Once all cameras were added, the NVVR can be added to the other NHServer (NHServer2 in this case).
4. If any kind of configuration on the cameras of the NVVR must be done (add or delete or replace cameras, change the ip address,etc), firstly, remove the NVVR from one of the NHServer (let's say NHServer2). Later on, change the configuration through the NHServer1 and ,once the changes are done, add the NVVR again to the other NHServer (NHServer2).

8.8 Automatic dvr reconnection

NHServer tries to reconnect disconnected dvrs but only in case the dvr was disconnected after NHServer was started-up. However, if the dvr was already unreachable when NHServer was started-up, it won't be reconnected automatically. In that case, users will have to connect it manually from Monitor.
Under very unstable networks (for example wireless) , this automatic process might reduce the NHServer stability. In those cases, it is recommendable to disable this automatic reconnection process. In order to do it, follow the next steps :

1 – Stop NHServer
2 – Open the file NHIPserver.exe.config by using any text editor. This file is saved in the NH installation folder
3 – Change the value of the parameter “MitsubishiPortReconnectionManagerEnabled” to “False”
4 – Close and save the file NHIPserver.exe.config
5 – Start NHServer

```
<!-- ======================== -->
<!-- application configuration -->
<!-- ======================== -->
<appSettings>
  <add key="Server" value="localhost" />
  <add key="EventsPort" value="55111" />
  <add key="MaxLibraries" value="300" />
  <add key="BetweenAttempts" value="60" />
  <add key="LostServerReconTime" value="10" />
  <add key="BetweenGOPs" value="40" />
  <add key="maxBuffers" value="4" />
  <add key="maxImagesBuffered" value="100" />
  <add key="ClientSettingsProvider.ServiceUri" value="" />
  <add key="NVVRVersion" value="1.4.4336.17348" />
  <add key="RefreshLTime" value="720"/>
  <add key="WaitBeforeUnloading" value="4" />
  <add key="ApiPort" value="8731" />
  <add key="ApiFTPPort" value="8732" />
  <add key="TheadStackSize" value="262144" />
  <add key="ConnectAllPorts" value="False" />
  <add key="ConnectDVRsAtStartup" value="True"/>
  <add key="KeepAliveDVRRootPlayPorts" value="60"/>
  <add key="MitsubishiPortReconnectionManagerEnabled" value="True"/>
  <add key="MitsubishiPortReconnectionManagerInterval" value="5"/>
  <add key="MitsubishiPortReconnectionManagerMinDeviceReconnectionInterval" value="15"/>
</appSettings>
<system.net>
```

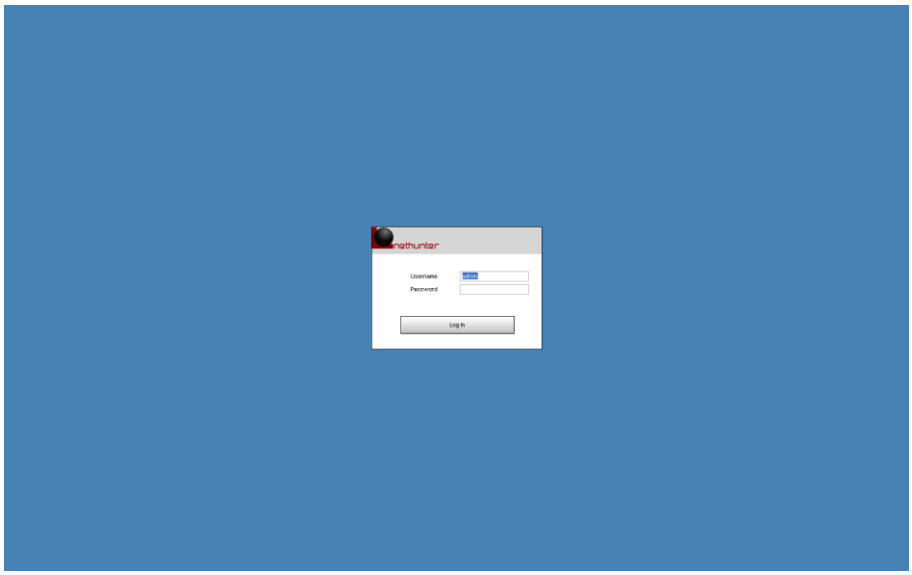
WARNING

The file NHIPserver.exe.config is a very important configuration file. If there is any mistake on it, NHServer might stop working. Edit it carefully. Don’t change any value unless your distributor tells you so. It’s recommendable to make a backup previously.

8.9 Auto log-off after an inactivity period

In some concrete scenarios, the NHClient PCs are installed in places where unauthorized users in NH might walk around. In these cases, if the logged user leaves the place for a while, unauthorized people might watch footage of the surveillance system. There are two options to cope with this security hole :

1. Activate the secure logon in Windows
2. Active the auto log-off in NHClient : When this capability is actived, if no activity is performed on the NHClient PC during “x” minutes , a log-in window is shown. No actions can be performed until the logged user logs in again.



In order to activate it, an internal parameter must be changed. Follow the next steps :

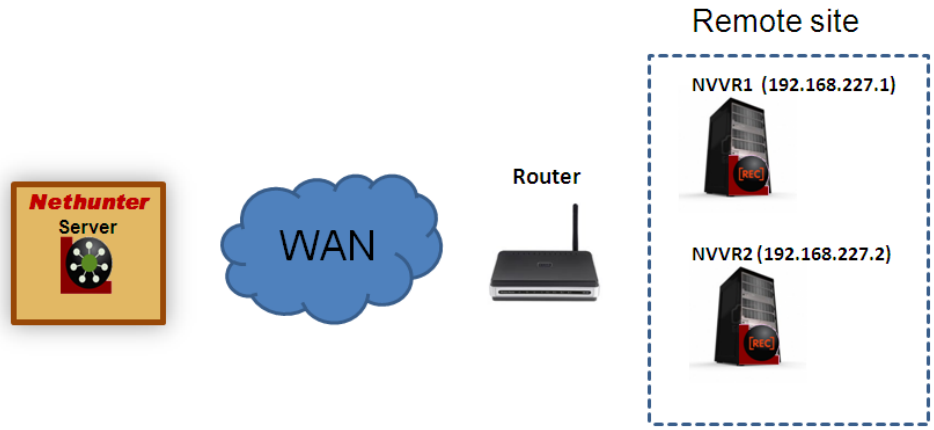
1 – Stop NHClient
2 – Open the file NHIPClient.exe.config by using any text editor. This file is saved in the NH installation folder
3 – Change the value of the parameter “AutoLogOffEnabled” to “True”
4 – Set the period of inactivity (minutes) in the parameter “AutoLogOffTimeout”
5 – Close and save the file NHIPClient.exe.config
6 – Start NHClient

IMPORTANT NOTE
While playback is being performed ,the auto log-off window will not be shown.

8.10 Two NVVRs in the same remote site

Note : This information is intended to be followed only by advanced technicians.

If the NHServer and the NVVRs are installed in the same LAN, no especial configurations are needed. However, if there is a WAN between both modules and there are more than one NVVRs in the same remote site, some special configurations are needed. Let's see a diagram about how the system looks like :



In order to configure the system, the next steps must be followed :

1 –Configure the router as follows. Note that the IP addresses are examples :

Entry port	Output IP	Output port
37000	192.168.227.1	37000
38000	192.168.227.1	38000
47000	192.168.227.2	47000
48000	192.168.227.2	48000

2 – Stop the NVVR2
3 - Use whatever text editor to open the file NVVR_Settings.xml in the NVVR2 , stored in the folder where the NVVR was installed (by default : c:\Program files\NetHunter\NVVR). Make the following changes framed in a red square:

```
<?xml version="1.0" encoding="utf-8"?>
<NVVRSettings Version="1.0">
  <Owner />
  <LastUpdated>0001-01-01 00:00:00</LastUpdated>
  <Name>NVVR</Name>
  <RecordingPath>C:\RECORDING</RecordingPath>
  <PrealarmPath>C:\PREALARM</PrealarmPath>
  <MaxDataSizeGb>75</MaxDataSizeGb>
  <MaxPrealarmSizeGb>1</MaxPrealarmSizeGb>
  <Cyclic>True</Cyclic>
  <RecordedDays>0</RecordedDays>
  <ApiPort>47000</ApiPort>
  <VideoTcpPort>48000</VideoTcpPort>
  <LogEnabled>False</LogEnabled>
  <MaxLogSizeMb>2147483647</MaxLogSizeMb>
  <MaxLogSizeDays>14</MaxLogSizeDays>
```

4 – Save and close the file NVVR_Settings.xml
5 – Start the NVVR2
6 – Register the NVVR1 in NH. Read the section where adding the NVVR is explained for more details.
7 – Register the NVVR2 in NH. The port must be filled in before the IP. In the port field set the value "47000". Read the section where adding the NVVR is explained for more details.